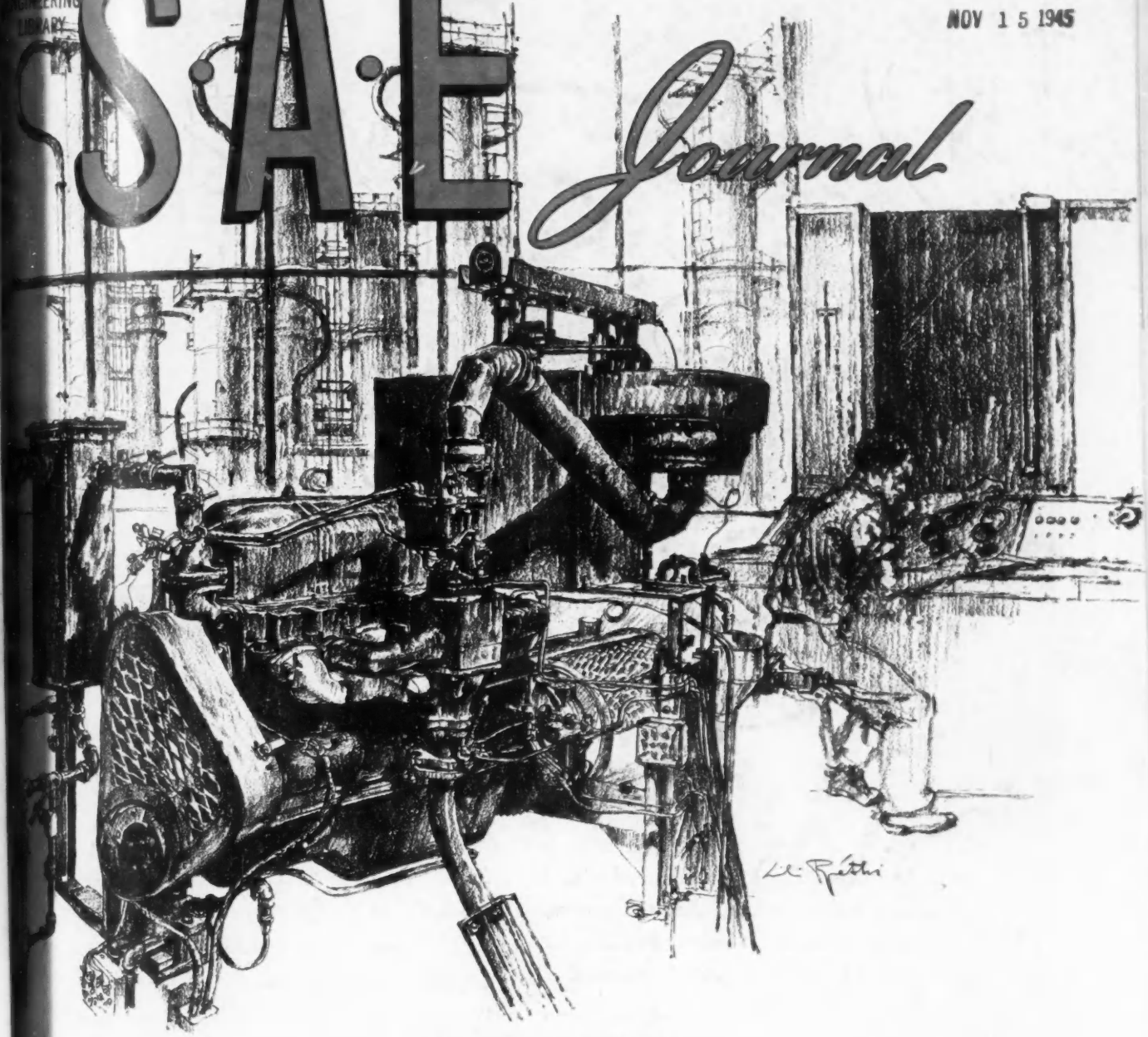
S·A·E Journal



NOVEMBER 1945

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc.

When the Test Came You Were Ready!

WHEN war came, America was faced with a serious problem. Would America's cars, trucks, buses and tractors be able to stand up for *years* under the pressure of home-front activity?

Today—nearly four years later—these same motor vehicles are giving dependable service to millions of men and women, despite an average age of nearly *eight years!*

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Because of *your* efforts America is still a nation on wheels. You deserve the gratitude of every American.

Here, at Perfect Circle, we well appreciate the importance of your achievements. In our own field, we like to think that we have made some contribution to your record.

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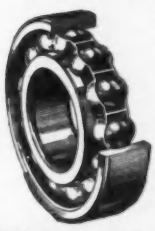
Nothing Rolls Like a Ball . . .

. . . and it looks as if the hungry gentleman above just can't digest that fundamental fact.

But, the fact that "nothing rolls like a ball" *has* been digested by machine designers. The simplicity of the *ball* bearing—which carries the loads on free-rolling, tough steel balls—is the answer to many a 64-*Million* Dollar Question.

Higher speeds, heavier load capacities, greater rigidity—in literally millions of applications—conclusively demonstrate the unique fitness of New Departure Ball Bearings for the new scheme of things mechanical.

We believe no other bearing has as many advantages as the *ball* bearing. Particularly the ball bearing backed by the technical skill, long experience and meticulous manufacturing methods of New Departure.



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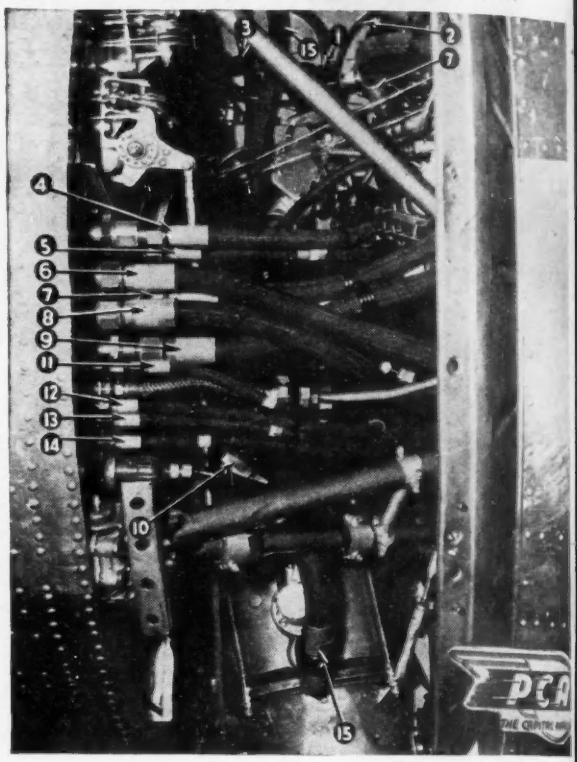
PCA CHANGES POWER PLANT INSTALLATION

Important economies and many operating advantages have been achieved by Penn-Central Airlines in changing to flexible hose lines instead of rigid plumbing in power plant installations.



1. Oil Vent.
2. Fuel Pressure Gauge.
3. Oil Line Return (Temp. Reg. to Tank).
4. Hydraulic Suction.
5. Hydraulic Pressure.
6. Vacuum Suction.
7. Fuel Supply.
8. Vacuum Pump Pressure.
9. Fuel Cross-Feed.
10. Oil Line (Temp. Reg. to Cooler).
11. Oil Pressure Gauge.
12. Manifold Pressure Gauge.
13. Carburetor Vent.
14. Fuel Pressure Gauge.
15. Oil Line (Cooler to Tank).

"We are able to show a definite dollar and cents advantage for these changes," stated a PCA engineering official. Aeroquip lines and fittings have been chosen because for many years they have proven their efficiency on such installations as brakes, landing gear retracting mechanisms and flap actuating cylinders. The illustration shows a typical installation made on PCA's DC-3 airplanes. As an example of savings effected, one item, the prop-feathering line, shows a unit cost reduction of 72% by changing to Aeroquip.

In addition to cost benefits, users have the further advantage of working with fittings that are reusable on Aeroquip hose, which can be "tailored to the job" from bulk stocks, with resultant simplification of inventory and elimination of maintenance delays.

Fire-resistant qualities of this hose contribute a **safety factor** of recognized importance. Aeroquip hose lines with detachable, reusable fittings, and self-sealing couplings are standard equipment in military aircraft and carry **CAA approval.**

Engineering circles are evincing a wide interest in enlarged possibilities for uses, as demonstrated by these power plant applications and numerous airlines are changing to Aeroquip installations.

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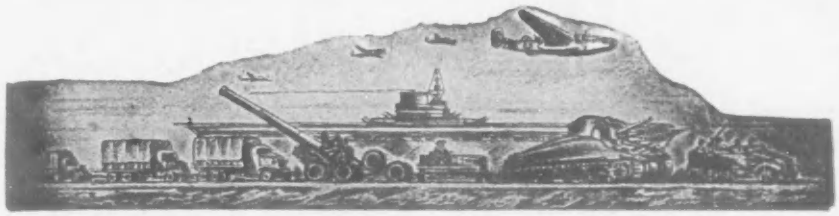

News of the **DECEMBER** *Issue*

By Norman G. Shidle

"Big"

IT'S interesting to speculate on what really makes an executive "big."

Depending upon who is calling the names, an executive may be termed "big" because he is powerful, because he has a large number of subordinates, because his department contributes heavily to profit-making, or for a variety of other reasons.

Gustav Metzman, president of the New York Central Railroad, observed recently: "I've never met an executive any bigger than the sum total of the personnel under him." The bigger the men under the executive, in other words, the bigger the executive himself.

Many successful leaders will agree on Metzman's yardstick. They seek and find men who know more than they do about a variety of problems; whose skills exceed their own. They are proud to praise these men to others in their own organizations; to cry their merits to outsiders. They are frank to credit men in minor positions with keystone contributions to the arch of their own success.

Only little executives in big jobs speak slightingly of their subordinates, making themselves look small by deprecating the size of those who work for them.

The higher an executive goes, the more likely he is to have humbleness in his heart – at least about what he owes to associates and subordinates. Really big executives usually will be found echoing the sentiments of the admonition which Chrysler's K. T. Keller once said his father gave to him:

"As you climb the ladder of success, my boy, don't muddy up the rungs, because there may come a time when you have to climb down again."

Tractors Benefit by Tank Progress

BORDERING upon amazing is the celerity and the extent with which wartime engineering developments are being adapted and applied to peacetime uses. It seems only yesterday that the Allies were wrestling with the problem of flotation as prior requisite of the successful use of tanks. It was only a short time ago that automotive engineers built the "weasel" for an army concerned with the job of transportation in war areas become trackless wastes of loose snow.

Development of rubber tracks for track-laying vehicles, especially farm tractors, began before the war; was accelerated as essential wartime engineering. Agriculture now stands to benefit by progress in this field, it will be reported in December *SAE Journal* by C. O. Slemmons, of The B. F. Goodrich Co.

Soil in agricultural areas, Mr. Slemmons will explain, loses its solid structure and supporting strength when tilled. Rain augments the need of farm vehicles for ample flotation and traction.

Three types of rubber tracks now possess attractive features for farm applications, each suited best to different conditions and uses. Rubber band tracks, used on Army half-track equipment, provide simplicity of construction. Band block tracks, used on the "weasel," provide low-unit pressure combined with low-track weight, reputedly can move a vehicle over "almost anything that has a surface." Flexible, friction drive tracks are regarded as suited particularly to the needs of light machines and cargo trailers.

Correction, Please

Before the apiarists and apiators among our readers descend upon us and sting us to death, we hasten into print with the fact that it is the drone—not the worker—of the bee community who pursues and finally catches the queen—does his one big job and then quits. (For the original misinformation on this matter see our editorial "Success Can Fail," p. 9, SAE Journal, October, 1945.)

N. G. S.

Tractors Inherit Tank Characteristics

Rubber Tracks Give Farm Tractors Effective Traction and Flotation Developed for Army Tanks

METAL PREFERRED IN CONTROVERSIES OVER AIRCRAFT MATERIALS

IN aeronautical engineering there seems to be no substitute for achievement in reaching a thoroughly reliable Q.E.D. Even the most appealing logic is likely, when theory meets practice, to lead only to the end of a limb.

Case in point is the controversy over wood against metal in aircraft construction. As Herb Rawdon, of Beech Aircraft Corp., will say in December *SAE Journal*, manufacture of planes from wood appeared back in 1940 to be the entirely logical detour of wartime shortages in aluminum alloys and seamless tubing. Putting theory to test, however, developed the answers.

Military aircraft of the same design, type, and size were built side by side in the same factory and in similar volume. Plywood was used for the one, dural for the other. Mr. Rawdon will report that, on the basis of this interesting experience, metal construction generally is more satisfactory. He will suggest:

Logic indicates that wood is easy to obtain, cheap to work. Practice shows that, with the typical airplane, only about 24% of the weight empty can be credited to possible substitution of wood materials.

Logic indicates cost savings. Practice shows that, except in cases of small planes, experimental types, limited production, and tooling, metal actually is cheaper. Example: Plywood costs 97¢ per lb, 24S-T alclad sheet and extrusion is 60¢ per lb. Wood scrap goes up in smoke, metal scrap brings 10¢ per lb.

Logic indicates wood is lighter. Practice shows that metal construction provides substantial savings in weight and bulk. In the case of members, such as spars, metal's weight is only 61% that of wood. In spar cap construction, measurement comparisons based upon pounds per inch of span give metal an 18% advantage over wood.

W-Fins Improve Engine Cooling

INCREASING the horsepower output of an engine involves a multiplicity of engineering tasks, including that of removing surplus heat. The greater the power, the greater the heat output, and the faster it must be removed.

For instance, between 1935 and 1942 the Wright Cyclone 9 was increased in output to about 1300 hp from slightly more than 800. Horsepower-displacement ratio soared to plus 0.70 from plus 0.40. Cooling became a problem of serious proportions.

What was done to improve the cooling fins will be told in December *SAE Journal* by J. W. Cunningham, of Wright Aeronautical Corp. Briefly, he will say it was found possible, by using "W" fins, to increase cooling efficiency, shorten production time, detour difficulties of application, and save materials – 2,000 tons of critical nitralloy barrel material per year being included.

Interesting will be Mr. Cunningham's comparison of the relative merits of "U" and "W" fins, reports of experiences with methods of manufacturing and attaching, advantages and disadvantages of using steel, copper, and aluminum fins.

The Cover

IN laboratories throughout the country the work of matching fuels to engines and engines to fuels continues to benefit both automotive and petroleum industries and make possible ever increasing economies for the public. In this month's cover drawing, Artist Lili Rethi shows work in progress at one of our great laboratories.

Movies Become Research Aids

BUSY executives, lamenting the tempering effects of fleeting hours upon their desire to accomplish, can appreciate the value of a device which magnifies time on the order of 2500X. Were its application universally possible, much could be done, at least theoretically, in a working day of something like 20,000 hr.

To date, the time microscope attributes of high-speed cinephotography have been devoted to working wonders with research and development. In this field they enhance the capacity of the human eye, and produce time-motion studies which have been invaluable.

For instance, engineers now can see exactly what takes place in diesel-engine fuel injection operations. Photographically, these operations can be prolonged to 2500 times their actual duration. In other words, the action of a second is extended to more than 40 min of observation.

As Cearcy D. Miller, of Aircraft Engine Research Laboratory, National Advisory Committee for Aeronautics, will report in December *SAE Journal*, high-speed cinephotography is producing results which demonstrate the advantages of multiple-orifice nozzles in diesels, show the effects of ignition lag, permit comparisons of combustion under differing conditions. In this work, photographs are made at the rate of 40,000 per sec.

Selected editorials by Mr. Shidle have been published under the title, "For the Sake of Argument."

This book is available to SAE members at 50¢, to non-members at $1, from Special Publications Department, Society of Automotive Engineers, 29 West 39th St., New York 18.

Turbine Progress Alerts Engineers

ENGINEERING subject headed for broadening discussion is that of turbines, generic name for a multiplying host of rotary engines, likely to be used as abbreviation for superchargers. Just what is developing in this field is any engineer's guess, but it seems as if permutation decidedly has set in, and surprising accomplishments are likely to come out.

These developments range the gamut from utilizing the exhaust gases of an internal-combustion engine, for producing additional power, to affixing superchargers to aircraft powerplants, in order to perpetuate the illusion of sea level operating conditions. There are engineers who profess to believe that eventually the tail will wag the mechanical dog, the engine functioning merely to operate the turbine.

The subject is rendered the more complex by growing controversy between engineering proponents of superchargers of the radial, or centrifugal, or outward flow, type, and of the axial, or multistage, or parallel flow, type. End products of both types seem to have critical differences, at least in the minds of their sponsors.

Essential to progress is understanding of the engineering fundamentals. These will be explained by W. J. King, of General Electric Co., in December *SAE Journal*.

Build Stability Into Helicopter With New Design

ANNOYING characteristic of early helicopter designs was instability, which gave occupants the dubious thrill of swinging back and forth through the air at ever-increasing amplitudes. This see-sawing started whenever the craft attempted to hover, and there is record that at least one helicopter swung completely over, landed upside down.

Early experiments with helicopters were directed to the job of flying, and experimenters ignored the fact that their craft functioned somewhat like a pendulum hanging from a rotor. When the difficulty became too embarrassing, resort was made to hinged rotor blades, with the result that then the helicopter really was a pendulum and acted accordingly.

December *SAE Journal* will publish a report by Bertram Kelley, of Bell Aircraft Corp., on successful development by Arthur M. Young of a stabilizing device which curbs these see-sawing tendencies. The two-bladed rotor is mounted to the mast by a Cardan universal joint, the blades forming, with the outer part of the hub, a single rigid structure.

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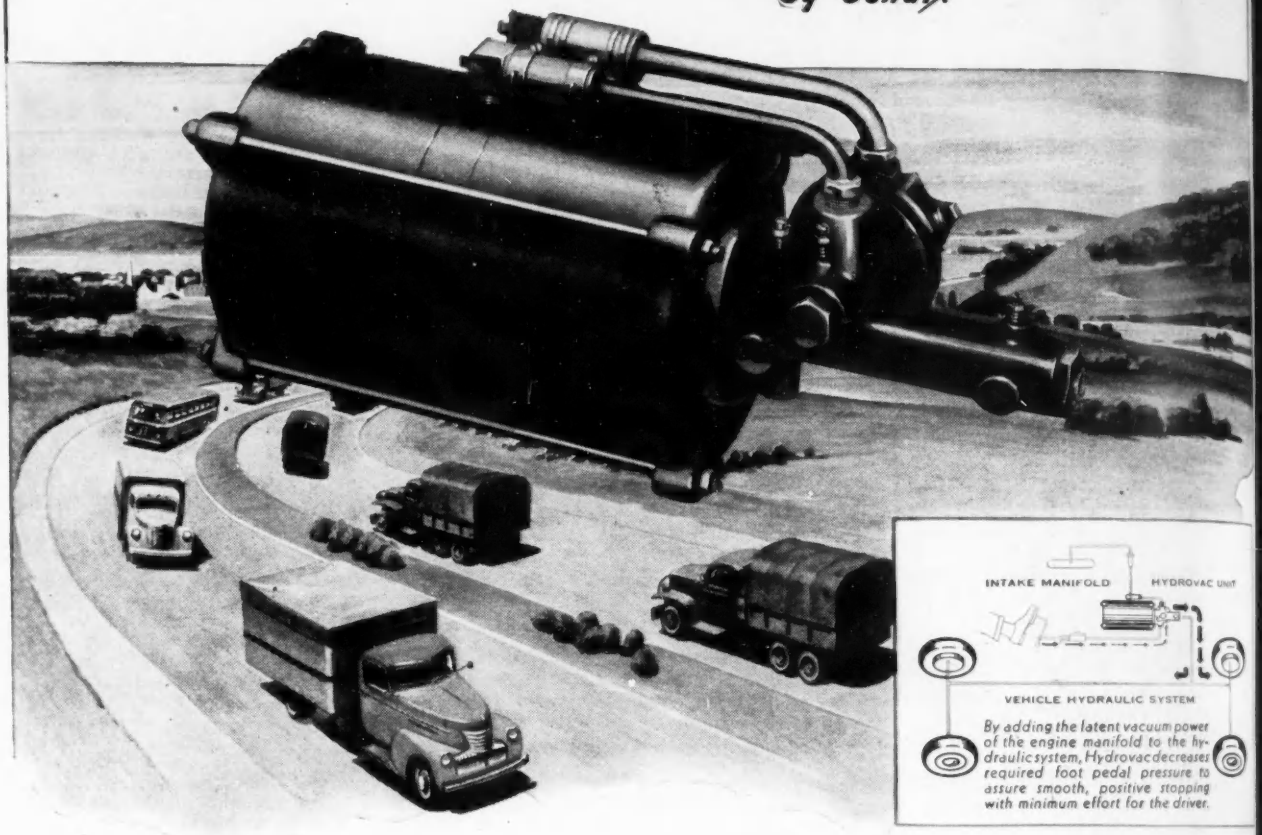
THIS IS HYDROVAC

By Bendix



The most advanced and best proved of all new power-braking units
Now available for trucks and busses

Hydrovac*—a hydraulic-vacuum power-braking unit developed by Bendix—is everything you expect a genuine postwar product to be. Moreover, although it is entirely new in design and performance—*the last word in advanced engineering*—more than a million units have been built and it has been proved by billions of miles of service on the world's battlefronts.

Now available for civilian trucks and busses, Hydrovac does the hard work of brake application, yet gives drivers the natural pedal action and feel needed for greatest safety and efficiency.

This mighty *mechanical muscle* is easily connected into the vehicle's hydraulic system and needs no adjustment at installation or in service. Because of its compact, sealed design, it has no outside working parts to clog with rust and dirt. And Hydrovac does not burden the engine because its power is derived from the vacuum already existing in the engine intake manifold.

If you own, sell, buy or service trucks or busses, you will naturally want to know more about Hydrovac—the most advanced and best-proved non-power-braking unit. For an interesting booklet giving full details, write direct to Bendix Products Division, South Bend 20, Indiana.

BENDIX PRODUCTS DIVISION

PRODUCT OF Bendix AVIATION CORPORATION

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MORE POWER to ENGINEERING

This article contains vital, practical, *interesting* ideas for *every* automotive engineer.

Exemplifying his own thesis that engineering presentations of all kinds must be made stimulating and thought-provoking if engineers expect to influence others, the author tells how engineers can increase their salaries, add to their prestige and get people to listen to them.

By J. C. Zeder

Chairman of the Engineering Board
Chrysler Corp.

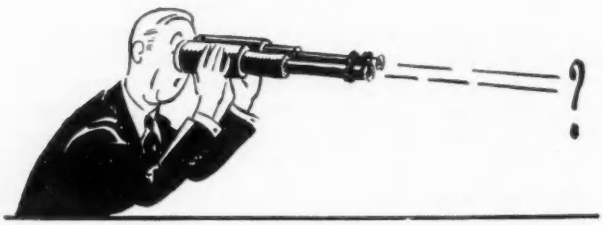
IN the course of our engineering progress we have steadily improved the technical caliber of our young engineers. But at the same time most of them have been given far too little help, either by precept or by example, in making corresponding improvements in the relationship between engineering and the people who should use its findings. In rare instances there are companies, individual engineers and universities who recognize the seriousness of the situation.

How important is it that engineers take valuable time from actual engineering problems to work on what appears to many as the "unproductive" job of human relations? It's just this important . . . by neglecting it, engineers have seen their best contributions lie unnoticed or rejected. But by giving it some attention, the effectiveness of the individual, and the profession, can be raised to entirely new heights. All of us know a number of fine engineers . . . really brilliant, outstanding men . . . who just don't seem to get along the way they should. And that's the trouble – they don't get along with people. As a result, they don't make the amount of progress, engineering or otherwise, to which they are entitled.

If there were time, we could drag scores of skeletons out of our engineering closets. Each one would be convincing evidence of the fatal results when engineers study *materials* but fail to study *people*. There is the common and constantly recurring example of the engineer who remains in obscurity while his great idea attains nationwide attention . . . to the glorification and financial benefit of a smart promoter. Again, there's the man whose engineering ideas always seem to be ahead of his time. His findings are sound, and they are certain to find eventual acceptance. But they fall on unresponsive ears when he offers them to the world. Then there are those times we all have experienced when the management at first failed to go along with our proposal to develop some particular new item. But, quite unaccountably, a few months later we found ourselves being urged into the activity by the

[This paper was presented before the Cleveland Section of the SAE on September 10, 1945.]

very people who turned us down. Perhaps by that time we had lost the chance of scoring an important "first" for the company, as well as for ourselves. No fault of the engineers, you say? It's a comforting viewpoint, but I'm afraid that too many times it just doesn't stand up. In almost every case, if we'll be as honest and as analytical as we try to be in other phases of engineering, we'll dis-



There are two types of engineer: the calm, unemotional, fact-finding scientist . . . No one can quarrel with the soundness of his approach. In contrast is the engineer who allows his enthusiasm to run away with his engineering judgment.

The latter does far more harm than good, but the former, striving to avoid the pitfalls of over-enthusiasm often goes too far in the other direction . . . turns the glasses around and invites people to look through the wrong end.

cover that the fault was mainly ours. The proof is that somebody else succeeded, where the engineer failed.

Why is it that engineers characteristically have troubles like these? *Where* do we go wrong? *What* can we do to correct the situation? Let's take a quick look at some answers to all three questions.

To get at one of the reasons why, let's recognize that there are two distinct types of engineers. One which is in the majority, and which we hold up as the example to follow, is the calm, unemotional fact-finding scientist, who doesn't allow unusual or unsupported findings to throw him off balance. His job is to discover all the faults, to foresee and explore every possible chance of failure, in order that advancement be based upon a thoroughly firm foundation. No one can quarrel with the soundness of that approach, and with the wisdom of keeping engineering securely anchored to that kind of a base.

In direct contrast, there is the other kind of engineer who allows his enthusiasm to run away with his engineering judgment. He is willing and eager to make predictions and claims based mainly on optimistic hopes. He is recognized and exploited as a gold mine by the writers whose delight it is to startle the world with pseudo-scientific predictions of modern miracles to come. In general, he does far more harm than good. The more we can keep such men out of engineering, and the fewer engineers are permitted to go in that direction, the better it will be for all of us.

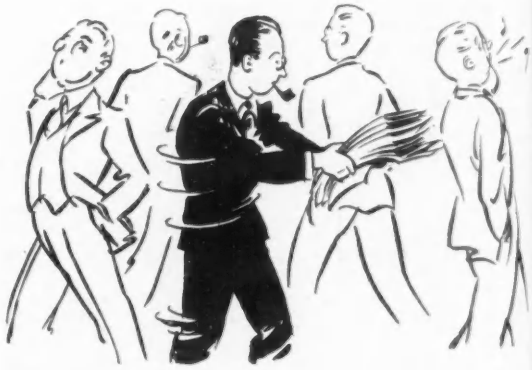
The difficulty is, that in striving to avoid the pitfalls of over-enthusiasm, we go too far in the other direction. It is true, we don't mislead people by showing them the future through high power, rose-colored field glasses. But sometimes we do almost as badly . . . we turn the glasses around and invite people to look through the wrong end. As a result, we discourage interest, rather than build it up. It may be an equal and opposite reaction, and it is understandable enough, but the actual truth, which is what we are striving for, is somewhere in between. Like any good machine, it's the *balance* that makes for smooth easy power.

There is another characteristic of engineering that is developing an increasingly insistent habit of leading us in the wrong direction. This is the growing tendency to become more and more highly specialized. From the educational standpoint, this has meant the crowding in of one advanced course after another. Consequently it has become steadily more difficult to find time, or approval, for the inclusion of these courses of study which are essential to the development of a well-rounded individual. Thus the very trend which makes the interpretation of engineering increasingly difficult, at the same time gives the engineer less instruction in how to make such interpretations. It is much like giving a student pilot a new plane with a greatly increased cruising radius, but at the same time giving him less training in navigation.

Trends like these have led to numerous unfortunate results. There is time to list merely a few.

One end product has been our unflattering reputation, not as engineers, but as people. The war proved that some of the opinions were far from accurate. For during this entire period the engineers have provided really outstanding examples of broadminded and unhesitating cooperation. They have worked not only within the profession, pooling information, sharing experience and facilities, but they have teamed up equally well with management, production, and all varieties of Government agencies. Yet as far as I know, engineers didn't suddenly change—they're about the same kind of people now that they always were. But I've been given to believe that they have been considered about the most difficult bunch in the world with which to get along. Why was that?

We didn't try to be contrary or stubborn. But when we insisted on something we felt was important, people just didn't seem to understand our point of view, sympathize with our problems, or appreciate our objectives. Time and again we faced the discouraging fact that nobody seemed even interested. But I wonder if we ever took the time to face an equally disheartening fact . . . that



Often, people don't seem to understand the engineer's point of view, sympathize with his problems, or appreciate his objectives . . . Time and again he is faced with the discouraging fact that nobody seems interested . . . Reason: Many times engineers are far from interesting!

many times we were far from interesting. And sometimes we weren't too understandable, particularly to those whose favorable decisions we hoped to obtain. If you doubt that, just dig into one of your own old personal files and do a little reading. Even to the genius who wrote it, the meaning may not be too clear, or the importance of the matter very apparent. We often felt misunderstood – and I'll venture to say that was at the seat of many of our difficulties and false reputation. We simply didn't make ourselves understandable – even if people were interested.

Here is another result of our tendency to overemphasize the material phases of engineering. We produce too many of the individuals we mentioned earlier – men who are under terrific handicaps when they are out of their own field. They are convincing proof of the statement "that the technical development of the engineer has far exceeded his sociological development." These individualists get along very well with their associates, they can talk learnedly and at length with other authorities on their own subject, and they can and do make significant contributions to engineering knowledge. But to others they are, far too often, just plain bores. What's worse, their usefulness is far less than it should be because they are sadly lacking in some of the accomplishments that would give them real power in securing engineering advancement.

Here are men whose brilliance is unquestioned, but whose ability to take their rightful place in business and society is pitifully inadequate. As a result, they unwittingly offend or disturb others. And because of that inability to sell themselves, there is little chance that their ideas will get much attention, or even be worth having.

In all fairness either to themselves or to others, we can't put them into positions of executive responsibility. For their own protection we instinctively try to shield them from outside contacts. Because they feel unfairly treated, and see others forging ahead of them, they tend to become bitter, or venture less and less beyond their own sphere of technical study. Consequently, the more engineering dynamite they get their hands on, the less likelihood there is that they can make good use of it.

The average engineering report gives little help to the executive reader whose time is limited. It is hard to find things in it. Indexes are the exception rather than the rule. Careful organization under numerous and explanatory headings is infrequent. Instead of being pointed up and emphasized, important facts and conclusions are frequently buried in a mass of detail . . . Charts and curves generally require considerable study to dig out their significance. Photographs or other illustrations often are insufficiently identified.

With the growing national interest in research, engineers will be entrusted with more power than ever before. We *must* be prepared to use it wisely and effectively. The most important step, and it is a big one, is to correct this retarded sociological development, in ourselves and in our future engineers. From our standpoint the emphasis needs to be, not on research, but on how to *use* research.

Sometimes engineering reports defeat themselves by their very size. A young engineer, who recently gave birth to a Britannica-sized technical epic, asked one of the company's executives if he had read it.
***"Read* it?" came the answer. "I can hardly *lift* it."**

All around us we see striking evidence that when this ability to work with people, to become an effective working member of industry, is combined with a sound engineering training, the result is leadership of outstanding caliber. Many of our ablest industrialists, the top executives of some of our largest corporations, were and still are engineers. But they have added the plus, the extra ingredient, that means power. For them the ceiling was unlimited.

Now, let's not be unfairly critical of the men who haven't made this kind of progress. Many times it's been the lack of a balanced education that has been to blame. For example, we can hardly expect them to be accomplished speakers without training. Yet there are times when the ability to talk easily, fluently, and forcefully would be extremely valuable.

In many cases the engineer's principal means of introducing or explaining his results has been through written reports. The difficulties he has with such reports are typical of those he experiences in all of his contacts with people outside engineering. Here again, his concentration on purely technical subjects has made the average engineer an untrained amateur in putting ideas down in clear-cut, understandable language. The unfortunate consequence is that our manner of presentation leads others to infer that we are confused in our engineering thinking.

Let's take a closer look at our engineering reports. They are of two kinds – one to record engineering progress, the other to present an idea or engineering recommendation. They go to different kinds of people, but each is highly important. Many of us dislike reading, let alone writing, them. Yet, many times they represent the principal end product of months of skillful and creative work. The contents may be a distinct and important contribution to engineering knowledge, and may point the way to significant advancements . . . but what does the average engi-

neering report look like? Well, it is probably a reasonably accurate facsimile of the hundreds of other reports that have been prepared over the last 20 years or so. Outside, it has the same drab cover . . . apparently the duller and less attractive, the better. Inside it is probably reproduced on cheap paper, by means of one of the less satisfactory methods of duplicating. Little attention has been paid to margins, heading, spacing and similar factors of physical arrangement. Yet those very physical characteristics can do much, either to convey the actual importance of the report or, if neglected, to destroy any feeling of value.

But how about the material inside the report? For one thing, there is little help for the man whose time is limited, but who still should be made acquainted with the principal findings reported. Charts and curves generally require considerable study to dig out their significance. Photographs or other illustrations often are insufficiently identified, so that the reader, unless he is an expert, doesn't know what to look for, or what particular point is being illustrated, without studying the entire report.

Sometimes our reports defeat themselves by their very size. You know the kind I mean . . . those "Britannica" type of epics that have everything in them except the laboratory itself. A young engineer of ours, who recently gave birth to such an epic, eagerly asked one of the executives if he had read it.

"*Read* it?" came the answer. "I can hardly *lift* it!"

You can prove the ineffectiveness of such reports, even with other engineers, wherever there is a technical library which has books and publications as well as company technical reports on its shelves. In point of actual fact, in its own technical reports the company has a source of current and specialized information which could well be a gold mine for every engineer on the staff. Yet, the librarian can tell you that it is the books and magazines from the professional publishers that get the attention, not the technical reports. Why? For one thing, books and magazines are designed to attract attention so they will be picked up, not passed up. But most reports are designed for overlooking, not for looking over.

Typical engineering reports lose out in competition with books or publications in another highly important respect. It is hard to *find* things in them. Indexes are the exception, not the rule. Careful organization of material under numerous and explanatory headings is but infrequently done. Too much dependence is placed on inference, rather than direct statement, to get the point across. Instead of being pointed up and emphasized, important facts and conclusions are frequently buried in a mass of detail. Little attempt is made to sum up and interpret the overall significance of the findings. Yet the information is valuable, complete, and in many instances, in advance of any

Engineering reports act as ambassadors *in absentia* for engineers and engineering departments. Yet, engineers often send them out unmindful of their forbidding countenances, their unkempt appearance, their complicated jargon and their awkward manners. Is it any wonder the engineer's day in court is not always successful?

Engineering education is becoming too highly specialized. Crowding one advanced course after another makes it increasingly difficult to find time, or approval, for the inclusion of studies essential to the development of the well rounded individual. This very trend which makes the interpretation of engineering increasingly difficult, at the same time gives the engineer less instruction in how to make such interpretations. It is much like giving a student pilot a new plane with greatly increased cruising radius, but at the same time giving him less training in navigation.

published material. But it is too uninviting, and it is too hard work to dig out the important facts.

Yet sometimes these same reports are expected to act as our ambassadors *in absentia*. They represent *us*. We send them out unmindful of their forbidding countenances, their unkempt appearance, their complicated jargon and their awkward manners. Is it any wonder our day in court is not always successful?

I've talked about reports only because they are typical. These same shortcomings are found in almost all types of engineering presentations. They include such things as requests for engineering equipment, proposals for new projects, presentations of new features, suggestions for changes in policies or organization, introduction of new techniques, of advanced methods of approach, or of new engineering principles. These may be in the form of correspondence, exhibits, special reports, technical papers or articles published in such technical magazines as the *SAE Journal*. Frequently they are oral presentations in the form of over-the-desk conferences.

But whatever form they take, remember this—many times it is their acceptance by the right people, which determines the rate and direction in which the individual engineer and the profession itself advance.

To bring more power to engineering, we don't need high pressure salesmanship, even in the ordinary sense. But we do need to give our new ideas a better chance of being accepted and put to use. We can do it by mak-

their presentation attractive, interesting and easy to understand. We can do it without sacrificing the critical analysis and strict adherence to facts we have always striven to maintain.

As a matter of fact, things as they actually are, without artificial coloring or enlargement, can be made interesting and convincing. They can attract attention, they can arouse and hold interest and they can produce action.

Are these suggestions mostly theories, or do they actually work? Most certainly they *do* get results – effectively, and sometimes with surprising speed. You may be interested in a couple of actual examples.

For some time, we had wanted a rather basic piece of equipment for one of our laboratories. To us the need seemed quite obvious, so in spite of the fact that the cost was rather high we made no special presentation of the matter. Instead, we simply gathered together a few interdepartmental letters, attached a catalog page of the equipment we wanted, and sent it along, with the usual purchase request, through the regular channels. It bounced. A little later we tried it again, with a little more correspondence, more literature, and another request. That bounced, too. Yet we wanted and needed the apparatus, and we felt sure that if the management had been given all the facts, in the right way, the purchase would be authorized without delay. So we made another try – this time a *real* one. It was designed, first, to secure the necessary attention; second, to indicate the importance we attached to the subject; and, third, to provide enough information of the proper kind to justify the expenditure, in the minds of the management.

It *looked* important – special cover, good paper, perfect typing, interesting illustrations. It was easy to read, easy to understand, and it was convincing. Of equal importance, it was beamed directly at the men whose approval was needed. It talked their language, emphasized advantages they would be interested in, and it was brief.

Altogether, it took quite a little time, thought and effort. But it worked . . . and in record time! What's more, the management not only bought our piece of apparatus but two more for themselves!

Here is another example of a different kind. After a long period of development and testing we were ready to release what we felt was an important new feature for our passenger cars. The chief obstacle was a high toolup cost. But to us the advantages to be secured far exceeded the manufacturing penalty. Unfortunately the management didn't see it our way, and turned us down cold, with no if's, and's, or but's. As a matter of fact, the way the matter was presented, the only logical answer was no. Yet, we still felt sure that if the full story had been known by the right people, the decision would have been different.

So we woke up and made a real effort to engineer a new and more effective presentation. That meant that we had to pay the same kind of attention to securing the acceptance of the feature that we had applied to its original development. The result was a highly interesting and complete picturization of the true value of the new feature. The emphasis was on its many advantages to both sales and production. Its effectiveness was such that we ourselves became more thoroughly convinced of the need to release the feature; and management, with ample information on which to make a decision, immediately reversed its original stand and authorized release right.

No engineer worth his salt would think of prejudging a piece of material or a new device until he had given it a thorough and impartial test. Yet how frequently does he find himself nursing along his own ideas like little hothouse flowers . . . and pouring cold water on an equally tender sprout of an idea that is sent in from the outside.

Again the key to approval and action lay in the adequate presentation of the idea. Once attention was attracted and the right information effectively supplied, the rest was easy.

Those two examples indicate what happens when this broader view of the responsibilities of engineering is applied to but one phase of the problem . . . the written and physical presentation of ideas. Both utilized two important principles. The first was the tailoring of the presentations to fit the interests and requirements of the individuals addressed. The second was the interesting and attractive physical appearance which succeeded in securing for the presentations the attention and sense of importance they deserved.

But, important as all these things are, the biggest and most permanent boosts of power to engineering will come from our future engineers. We must give them that breadth of understanding and completeness of personality which can rise only from a basic foundation of truly broad education. We should permit them to become specialists only after they have been thoroughly prepared to handle and make effective use of such advanced knowledge.

There should be engineering courses in report writing, in public speaking, in business methods, in sociology and in administration. Not only should the engineering student be required to take such subjects, but the courses themselves should be specially prepared to fit the special needs of engineering. The universities themselves cannot be expected to do this unaided. We, in industry, must provide the practical assistance and, if need be, the definite pressure required to accomplish what sometimes may be rather radical changes.

We have more than an academic interest in the matter. Because a majority of these future engineers must find a place for themselves in industry, it is to industry's advantage to take an interest in the kind of preparation they receive. And by the same token, our engineering schools must be persuaded to keep more closely in touch with the fields of applied engineering into which they turn loose their students. In a few cases, this kind of mutual contact has been established, with outstanding benefits to everyone concerned. But unfortunately these are rare exceptions, not the rule.

There is just one more thought I would like to leave with you. Thus far we have talked mainly about what

we want and of the ways in which we can attract favorable attention and acceptance of our ideas. But how about the reverse side of the same picture . . . the consideration we should give to suggestions and requests coming to the engineering? It is a big subject, and would take an entire evening in itself to begin to discuss. But, in my opinion, one of the surest ways of guaranteeing fair and understanding reception of our ideas is to go out of our way to maintain a sympathetic and constructive attitude toward what the other fellow asks of us.

No engineer worth his salt would even think of prejudging a piece of material or a new device until he had given it a thorough and impartial test. Yet, how frequently do we find ourselves almost automatically playing down the possible merits of engineering suggestions or requests coming to us from nonengineering sources. You all know how tenderly we like to nurse along our own little hothouse flowers. We water them, see that they get every possible bit of sunshine, protect them from drafts and give them every possible chance to live and grow. But how easy it is for us to pour cold water on the equally tender sprout of an idea that is sent in to us from the outside.

In the first place, if we succeed in killing the idea, we may have lost an important opportunity for real engineering advancement in which we would have had a part. Or, if the idea survives, it may well grow to place us in a highly uncomfortable but not entirely undeserved position of embarrassment.

In the second place, but of even greater importance, let's recognize that in many instances, the attitude of others toward us as engineers is a direct reflection of the way we behave toward them. So if we expect to *receive* sympathetic attention and backing, we must *give* consideration and support in return. If we are smart, we will give it in advance.

While civilization owes a great debt to engineering, we shall, in the future, have even greater responsibilities. I do know that engineering progress can no longer be confined within the limitations of technological advancements . . . we shall have to interest ourselves in the administration of our devices. I do know that there is no finer preparation for leadership and success than an engineering training, supplemented by broad education and practice in effective human relations. And, finally, I do know that "the technical advancement of the engineer has far exceeded his sociological development."

Together we must see to it that engineering reaches these major objectives:

Better human relationships between engineering and all other fields . . .

More effective presentation of engineering ideas . . .

Closer coordination between industry and our centers of engineering education . . .

A broader education for all future engineers . . .

and as a final result . . .

A broader overall conception of the obligations, scope, capabilities and future of our engineering profession.

Let us start NOW . . . before engineering loses its warborn impetus. The opportunity is ours. We can ill afford to let it pass!

SAE Coming Events

NATIONAL MEETINGS

FUELS & LUBRICANTS, Nov. 6-7,
Mayo Hotel, Tulsa, Oklahoma

Eight prepared papers by 11 outstanding authorities, and 12 prepared discussions. DINNERS on Nov. 6 and 7.

AIR TRANSPORT ENGINEERING, Dec. 3-5,
Edgewater Beach Hotel, Chicago, Illinois

Fourteen papers at seven technical sessions, with prepared discussions. Covering advanced practices and outlooks into the future by leading airline engineers. BANQUET, Dec. 4.

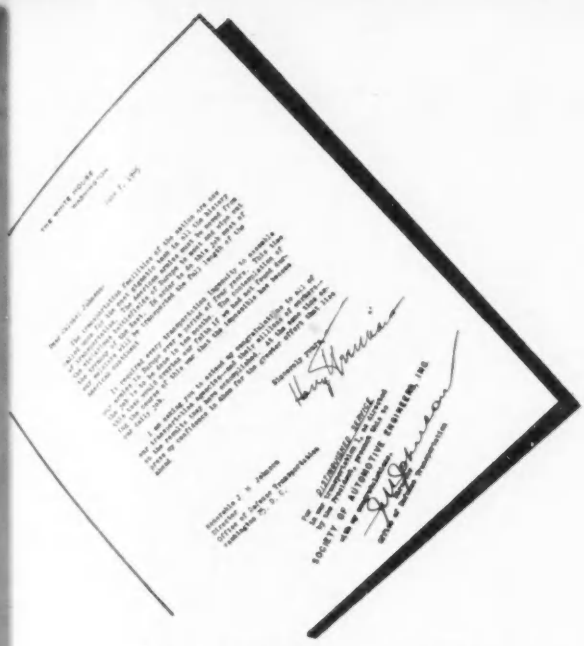
SAE ANNUAL MEETING and ENGINEERING DISPLAY, Jan. 7-11, 1946
Book-Cadillac Hotel, Detroit, Michigan

Annual Meeting Banquet, MASONIC TEMPLE, Jan. 9. HENRY FORD II, Speaker. W. J. Davidson, Toastmaster (See p. 32).

AERONAUTIC (Spring) April 3-5, 1946
New Yorker Hotel, New York City

Eleven outstanding sessions on Aircraft, Aircraft Powerplant, Airline Operation, and Accessory Engineering. DINNER, April 5.

Section Meeting announcements, p. 47.



President Truman Cites SAE T&M Committees For Aid in War

June 7, 1945

Dear Colonel Johnson:

The transportation facilities of the nation are now called upon for the most gigantic task in all the history of transportation. The American armies must be moved from the victorious battlefields of Europe to meet and wipe out the tyranny of the East. In order to do this job most of our soldiers will be transported the full length of the American continent.

It required every transportation ingenuity to assemble our armies in Europe over a period of four years. This time the job is to be done in ten months. The contemplation of this task would overtax our faith if we had not found during the course of this war that the impossible has become our daily job.

I am asking you to extend my congratulations to all of our transportation agencies--and their millions of workers--on the results they have accomplished. At the same time express my confidence in them for the greater effort that lies ahead.

Sincerely yours,

Harry Truman

Col. Johnson, ODT Chief, Transmits Citation

J. W. Johnson, director of the Office of Defense Transportation, in a letter just received at SAE Headquarters expresses his official appreciation of the war job done by the SAE Maintenance Methods Coordinating Committee and its subcommittees.

Of these SAE-T&M groups, Mr. Johnson writes: "I express my sincere thanks and wholehearted appreciation of their patriotic effort that produced the numerous engineering reports that were so desperately needed at the time."

Mr. Johnson wrote at the same time of the discontinuance of the activities of the Maintenance Section of the Office of Defense Transportation, the agency headed by W. J. Cumming, under whose direction the T&M committees performed these vital war services.

HAMILTON MIGEL, eastern manager of Magnaflux Corp., was speaker at the first meeting of the **NEW ENGLAND SECTION,** attended by over 70 members and guests, including M.I.T. students. Mr. Migel's Topic was "Magnaflux in the Automotive Field." According to the speaker, the old "safety factor," considered good engineering, was actually a "factor of ignorance." Design engineers used it because of inability to estimate stresses, or to tell whether materials used would be of uniform quality. Much has been learned about stresses through modern methods of analysis, and the automotive engineer has become more "inspection minded" as a result of the needs of war. Special inspection methods, among them Magnaflux for magnetic materials and Zyglo for nonmagnetic, may be effectively applied to assure a better product and to reduce cost through quality control. Prerequisite for success is complete knowledge on the part of inspectors of the characteristics of parts subjected to test. Wide postwar application in the automotive field is predicted.

Season opened for the **CHICAGO SECTION** with a play-day at Westward-Ho Country Club on Sept. 14, with 300 members and guests present. Two hundred entered the golf tournament to compete for some of the 120 prizes provided by George Hammel's Prize Committee. First prize went to John Lichter. Following dinner, Herb Graffis, columnist and radio commentator, presented prizes and welcomed back Joe Moller, discharged from the Air Corps.

The Chicago Section's Truck, Bus and Railcar Activity opened Oct. 8 with a three-speaker program that attracted nearly 300 members and guests. George Stevens, technical chairman and vice-chairman of the Truck, Bus and Railcar Activity, directed preparation of the meeting.

Fred B. Lautzenhiser, consulting engineer of the Motor Truck Division of International Harvester Co., discussed "Facts and Predictions about Motor Transport and its Use." The design of new trucks, he said, will stress function; will be lighter but stronger, and will provide increased payload capacity and better distribution of load. We may expect such features as automatic transmissions, fluid drive, torque converters, central tire inflation systems and perhaps central chassis lubrication.

Robert Aldag, Jr., assistant to general supervisor of automotive equipment, Chicago Burlington & Quincy Railroad, speaking on "Diesel Locomotive Operation," described the efficiency and high productive capacity of the diesel-electric locomotive as compared with the steam locomotive for both passenger and freight service. Principal advantages are faster acceleration in low speed range; improved performance over adverse grades; increased overall average speed, permitting reduction in overall time; greater availability between repairs, and saving per pound of fuel.

Lawrence H. Smith, vice-president in charge of development for General American Aerocoach Co., Chicago, discussed the factors determining production of improved types of motor coaches for city and intercity service. The five qualities emphasized in the construction of the modern coach are safety, comfort, automatic operation, efficient performance, and appearance. Standardization of design, according to Mr. Smith, is made difficult by varying state bus regulations. Recent progress in design has included raising of performance standards, simplification of maintenance and repair, and development of such important features as improved fireproof construction, escape-type window sash, driver comfort, automatic gear shifting, liberalizing of aisle space, and heating and air conditioning facilities.

Opening meeting of **SOUTHERN NEW ENGLAND SECTION** featured a discussion by Joseph Geschelin, Detroit Editor of *Automotive & Aviation Industries*, on "Relationship of Engineering Design to Modern Production Techniques." Mr. Geschelin estimates that the manufacturing art has accelerated 10 or 20 years during the past five years, but believes that the adaptation of this progress to peacetime usage is more difficult than is generally realized. Diversity of wartime products and rapidity of production changes have left many manufacturers in ignorance about operations other than their own. In some cases tools of war must be effectively applied to peacetime manufacture: in others, manufacturers must acquire modern equipment to meet present cost and competition situation. Prime needs, then, are for the interchange of information and experience, for closer collaboration between engineering and manufacturing departments. Machines have been devloped which, if handled properly by engineers in conjunction with producers, will bring about radical changes in manufacturing practice.

Howard Smith, metallurgist for Beech Aircraft, was speaker at first dinner meeting of **WICHITA SECTION,** Sept. 20. Mr. Smith discussed silver brazing and alloys, indicating that most available material on brazing is incomplete, in some cases distinctly misleading. Movies were shown after the meeting. About 50 were present.

The saving in time, labor and production cost brought about by the use of induction heating units was a large factor in final victory, according to Dr. H. B. Osborn, Jr., director of research of the Tocco Division of the Ohio Crankshaft Co. Addressing the **INDIANA SECTION,** Oct. 11, Dr. Osborn pointed out that smaller manufacturing organizations without conventional heat treating ovens were able to turn out immense quantities of munitions whose production required heat treating. In the field of civilian production, he said, the picture is also brightened because of the wartime expansion of such facilities. Plants are already using these adaptable units to turn out engine and other automotive parts for civilian vehicles.

Rambling Section

Forty members of the **KANSAS CITY SECTION** were present at the first meeting, Sept. 11, to hear Capt. Roland P. Kauffman, USN, present a vivid description of adventures in the South Pacific aboard the "Intrepid." After a long and interesting question period, a color film entitled "Advance Base" was shown. This was an absorbing picturization of the heroism and technical skill of our Navy, Marines and Seabees in the fighting and construction work which occurred during the attack and capture of a tactically important island.

The **DETROIT SECTION** opening meeting on Sept. 24 was attended by 750 members and guests who heard a spirited debate on "Frames" and "The Frameless Car." Theodore Ulrich, chief body engineer of Nash-Kelvinator Corp., defended the frameless car, while N. T. Dietrich, of Midland Steel Products Co., set forth the advantages of the frame. SAE Past-President William B. Stout acted as umpire and leader of the discussion session. Unusual feature of the discussion was the eager participation of the audience, including SAE President James Crawford. Mr. Ulrich claimed advantages in weight savings and greater durability because of improved strength and stiffness in the frameless car: Mr. Dietrich emphasized strength and rigidity supplied by the frame, minimum cost, ease of repair and versatility. Mr. Stout in his impartial capacity maintained that "it depends upon which end of the elephant you are looking at." At the preceding dinner, 523 members heard Wilbur Shaw, special representative of Firestone Aircraft Co., describe his most exciting experience on the Indianapolis Speedway.

SAE JOURNAL FIELD

Baltimore – Webster H. Francis, Jr.
Buffalo – No Appointment
Canadian – Warren B. Hastings
Chicago – Austin W. Stromberg
Cincinnati – Charles W. Coote
Cleveland – Richard E. Brown
Dayton – W. D. Hazlett
Detroit – W. F. Sherman
Hawaiian – Al Molloy
Indiana – Harlow Hyde
Kansas City – Harold F. Twyman
Metropolitan – Duis W. Meador
Mid-Continent – No Appointment
Milwaukee – L. A. Wilson
New England – Arnold R. Okuro
No. California – J. H. MacPherson
Northwest – No Appointment
Oregon – No Appointment

Through Reports

Agricultural Meeting of the **WESTERN MICHIGAN SECTION** on Sept. 20 was attended by 68 members and guests. Guest Speaker Lee H. Ford, supervisor of Educational Relations for International Harvester Co., presented a paper on "Recent Developments in One-Man Operated Farm Machines." Mr. Ford discussed six new machines, pointing out the improvement in quality and quantity of crops which they make possible. He also emphasized, with the help of a Kodachrome movie, the labor-saving properties of each machine, and the potential social benefits to the farmer through increased leisure hours.

Atomic energy is obtained by the partial or complete destruction of matter – a concept ruled out by the old theory of the conservation of matter, Dr. L. N. Leum explained in describing the development of atomic power at the Oct. 10 **PHILADELPHIA SECTION** meeting. Dr. Leum, who is a member of the research and development staff of Atlantic Refining Co., and Dr. H. Ramser, senior research chemist for the same firm, were co-authors of a paper on Atomic Energy. Dr. Leum, who presented the paper, concluded that our job now is to the paper, said that to date scientists are able to use only four elements to produce atomic energy: uranium, thorium, neptunium and plutonium, but that cheaper and more plentiful elements may soon be found useful. As for its constructive application, he believes that its continuous chain action would make it most readily applicable to the jet type engine. He concluded that our job now is to set the pace in showing the constructive uses of atomic power, and to develop means of combatting its use for destructive purposes.

FIELD EDITORS

Peoria – No Appointment
Philadelphia – Laurence Cooper
Pittsburgh – No Appointment
St. Louis – C. C. Butterworth
So. California – T. D. MacGregor
So. New England – Claude O. Broders
Syracuse – No Appointment
Texas – No Appointment
Washington – E. K. Owens
Western Michigan – No Appointment
Wichita – J. H. Miles
Colorado Group – No Appointment
Mohawk-Hudson Group – No Appointment
Salt Lake Group – No Appointment
Spokane Group – No Appointment
Twin City Group – No Appointment
San Diego Unit – Grant B. Hodgson

At Milwaukee Athletic Club, Oct. 5, 150 members and guests of the **MILWAUKEE SECTION** heard Robert Cramer Jr., assistant chief engineer of Nordberg Manufacturing Co., speak on "Recent Developments in Large Diesel Engines." Development of the Nordberg Diesel engine from the stationary type unit was shown by a series of slides. The progress which has been made is clearly illustrated in the flexibility and maneuverability of one of the newest types in which two engines drive the propeller through electric couplings. This achieves balance of the load while cruising, and quick action for maneuvering. One engine may be reversed for backing the ship while the other is ready to take over the job of moving forward quickly.

One problem Mr. Cramer stressed as important is torsional vibration, which, if allowed to become excessive, can cause propeller shaft and crankshaft breakage. Mr. Cramer explained that to suppress the tendency for torsional vibration to occur over a wide range of speed, as required in marine service, dampers have been designed to be mounted at the forward end of the shaft.

Mr. Cramer's presentation concluded with a slide-sound film entitled "Here's How," one of a series of training films used in teaching service personnel how to operate Nordberg Diesel engines on Navy vessels.

CANADIAN SECTION held its annual Hamilton dinner meeting at the Hamilton Golf and Country Club, Sept. 14, with 125 attending. A few of the more audacious members played golf undismayed by the rain. Speaker was Arch T. Colwell, SAE past-president and vice-president of Thompson Products. His topic was "What's What in the Coming Cars?" a title which covered material ranging from nuclear energy and supersonic speed to some motor vehicle productional prognoses.

SAE Past-President Arch T. Colwell (center) shown chatting with Frank M. Morton (left), senior vice-president, and George J. Beattie, Canadian Section chairman, in the locker room of the Hamilton Golf and Country Club.

More than 300 members and guests attended the **METROPOLITAN SECTION** Brake Symposium Meeting Sept. 6 in the Pennsylvania Hotel, where Vice-Chairman E. N. Hatch of the Section's Transportation & Maintenance Activity, introduced Burns Dick, consulting engineer, Wagner Electric Corp., and B. E. House, Bendix Products Division. Stephen Johnson, Jr., Bendix-Westinghouse Air Brake Co., started a vigorous discussion which was participated in by more than a score of brake experts and fleet operators. Highlights: . . . airplane type disc and expander tube brakes cannot handle continuous braking, cost from 2½ to 3½ times conventional braking equipment . . . coordination of operators' requirements with brake designs forecasts substantial improvements . . . engineers need more fundamental technical knowledge of brake system materials to improve design.

Gen. Carl Spaatz and Lt.-Gen. James H. "Jimmy" Doolittle, an SAE member, were speakers at the Oct. 11 meeting of the same section at the Hotel Pennsylvania. Over 850 members and guests were present, packing the meeting to standing room. Section Chairman R. Dixon Speas introduced E. J. Foley, vice-chairman for air transport, who introduced the speakers.

General Spaatz emphasized the importance of air power in the winning of the war and the keeping of the peace, and the necessity for constant vigilance on the part of people and government. American thinking, he said, must be stripped of complacency and naive faith in imperfect weapons . . . we must learn to think in terms of preparation and cooperation.

General Doolittle reiterated General Spaatz's warnings, stating that the best way to keep out of war is to be prepared for it. He proposes a Department of National Defense, equipped for essential research activity; a coordinated military service, under a supreme commander, with the air force raised to parity with other branches, and continued engineering research by all firms providing military supplies.

In the lively and informal question period following the speeches, both reasserted the danger we are in, the need for preparedness, and the ever increasing importance of air power.

Feature of the first fall SYRACUSE SECTION meeting, Oct. 8, was an inspection trip through a navy gun shed used to train future officers. Many of the members were interested to find in the installations parts which they had been fabricating as sub-contractors.

Field Ground Schools Implement Pilot Instruction

by WILLIAM B. LESTER, JR.
American Airlines, Inc.

■ Kansas City, June 7

(Excerpts from paper entitled "Development of an Airline Training Program for Flight Personnel Involving 4-Engine Equipment")

THE need for an adequate 4-engine training program for flight personnel is a significant problem with which numerous airline operators have been faced for some time.

Post-war training of flight crew members will undoubtedly be chiefly governed by the amount of investment which each individual air carrier is capable of affording financially. The "on-the-job" plan is generally regarded as the least expensive method, since it permits increased manpower being available while training is in progress.

I believe, however, that a combination of centralized and on the job training is the logical method of instruction. Often on the job instruction for flight crew members is costly since it necessitates flying on the part of individuals who have not yet been introduced to the particular problem involved.

If centralized training were attempted to the exclusion of other possible methods, on the other hand, this might prove too costly in view of value achieved. A student can only absorb a limited amount of instruction during a given interval of time. The amount of information required during the progressive training desired over a period of several years cannot be condensed into a two-week course immediately following employment. It is also not possible to permit a flight officer to return to a central training school every six months in order to refresh his memory or present new techniques.

Transportation costs, salaries, expenses and other items render it financially impractical to periodically rotate all flight crew members through such a center at very frequent intervals. It is possible, however, to conduct certain essential training activities at a centralized training base, in order to provide standardized procedures and operating techniques being taught by a minimum number of expertly qualified instructors. Thus, various courses for flight officers could be covered in a matter of days or a few weeks.

By strategically locating a limited number of supplementary field ground schools at chief pilot division points the key courses previously taken at the central school can be thoroughly coordinated with the on the job phase of flight crew training. The numerous intermediate steps of upgrading, simple reviews, and introduction of new subject material can be handled at the field schools. Such a physical arrangement permits each crew member to participate in a consistently productive program until sufficient time has elapsed to warrant his reassignment to the central school for specialized flight and ground transition training.

All flight crew members could receive their initial course of training at such point at the time of their employment. After a sufficient period of time, a pilot could be returned to the school, perhaps two years later, for the purpose of completing additional flight instruction in conjunction with receipt of his airline transport pilot and equipment horsepower ratings.

One advantage of the field ground school is that it forms the link between the airline pilot in the field and the central training organization. Supervisory personnel who are responsible for the overall direction and administration of the training program can easily follow the individual progress of any student from the day of employment until he leaves the company.

By means of such a system a much greater possibility exists of getting the right type of instruction material effectively placed before the flight crew members. Transfers can be made from one pilot division to another without influencing to the slightest degree the continuity of training which each crew member shall receive.

In order to insure sufficient information being available, an adequate training program must constantly be conducted for the instructor personnel. With the advent of four-engine equipment virtually upon us, it will pay many operators to look over their instructor staff and see what they can do to qualify those individuals through sufficient training and experience being provided to them, so that they may carry on this essential training in the most effective manner.

Revised Training Programs Adopted by New Airlines

by R. C. STUNKEL
Lockheed Aircraft Corp.

■ Kansas City, June 7

(Excerpts from paper entitled "Indoctrination Period for Operation of New Type Airline Aircraft")

THE general problem of indoctrination of a new type airline is one of joint manufacturer-operator concern.

The major element in any indoctrination program is one of time. The time span for pre-operational planning may be divided into the following categories:

Training: This may be accomplished by (1) instruction at the factory of the operator's key personnel who will, in turn, form the nucleus of the operator's expanded training effort; and (2) by manufacturer's instructors training operator's personnel at the site of the airline operation. Of the two methods, the first is the more desirable. Lectures, wall charts, cut-away demonstration units and operating functional mock-ups may be used as training aids.

Systems and Procedures: Systems now in use for the servicing of aircraft must be altered considerably or completely new systems adopted to permit the most efficient operation of the new aircraft. Since airline operators seldom have uniform systems of maintenance, it will always be necessary to convert the basic material developed by the manufacturer to conform to the system of operation desired by the operator. This development work should be accomplished through the combined effort of the manufacturer and the operator prior to the delivery of the first aircraft.

Facilities and Equipment: One of the largest tasks, and the study requiring the greatest outlay of the operator's capital, is the development of facilities and the procurement of the necessary equipment for operating the new aircraft. Since the development of equipment and facilities must precede the procurement of the aircraft, it would not be too idealistic to presume that the training of airline personnel could be accomplished on the equipment selected using the system developed for the maintenance of aircraft; thus affording a complete indoctrination program permitting earlier operation of the airplane.

Assistance by the manufacturer may assume these forms:

1. He may actually design and make available for purchase by the operator the necessary equipment required.

2. He may subcontract the design to a third party from whom the operator could make direct purchases.

3. He may work with equipment engineers of the airline for the determination of basic requirements, after which the airplane would assume full responsibility for the development and manufacture of equipment to its own standards.

Provisioning: Provisioning for operation of new types should be accomplished only after a careful consideration of the system of maintenance to be used on the new aircraft and the purpose behind some of the manufacturer's design configurations. Provisioning personnel for the airplane should therefore take into account the reasons for three engineering advances in order that the greatest equipment utilization might be realized. In this instance, interchangeable units should be purchased as an assembly together with the necessary parts for the regular overhaul of accessories comprising the unit. Only the operator can determine how many units will be required, but the manufacturer can interpret his design philosophy in terms of what each unit shall comprise.

The indoctrination program should extend beyond the training function, and encompass all factors influencing an early understanding by the operator of new requirements precipitated by the acquisition of a new type of aircraft.

Ideas for Training

Modern Processes Adapt Fuels for Aviation Use

by LESTER STEFFENS
Socony-Vacuum Oil Co., Inc.

■ Dayton, April 24

(Excerpts from paper entitled "The Mechanics of the Manufacture of Aviation Gasoline")

THE petroleum refiner's raw material, crude oil, is a mixture of many components – hydrocarbon molecules covering a wide range of sizes and shapes. There are also small amounts of sulfur, oxygen, and nitrogen compounds which for the most part constitute undesirable impurities and must be removed.

The refiner first sorts his raw materials by size, using a distillation unit which functions to separate groups of hydrocarbons according to their boiling points, the boiling point being related primarily to the molecular weight, which is a direct measure of the size of the molecule.

Next, he reduces the oversize components of the crude oil to aviation fuel size by "cracking," that is, by breaking up the 300 to 750 F boiling range components. The thermal cracking process accomplishes this by means of heat only, using temperatures of 900 to 1100 F. Thermal cracking is in a way a crude operation, and might be considered as breaking up the large molecules primarily by the application of brute force.

Catalytic cracking also makes little ones out of big ones. This operation is performed at 800 to 950 F, and it produces molecules not only having the right size, but having a highly desirable shape as well. It has the advantage over the thermal process of producing no heavy fuel (tar).

The refiner then gathers up the gases from his cracking operations, sorts them again by distillation, and joins the selected ones, two molecules at a time, again obtaining products with both the right molecular size and the desirable structure. These operations, called polymerization and alkylation, can be considered as the reverse of cracking. Not completely satisfied with the structure of his original products, the refiner is able to reshape some of them without changing their size, by means of another catalytic process called isomerization.

The refiner still has to get rid of sulfur and other undesirables, which he does by various chemical treatments, caustic washing, acid treatment, and so forth, at various stages in the processes. The rest of the job of making aviation fuel is merely a matter of mixing the products from the separate processes in order to obtain a gasoline meeting the desired specifications. The straight run gasolines from selected crudes are satisfactory for the lower grades, but the quality desired for combat and long range transport requires the use of the synthetic products – alkylate and catalytically cracked gasoline making up the bulk of the blends.

Fuel Characteristics

The design and performance of the powerplant of a plane are dependent equally on the characteristics of the available materials of construction and on the characteristics of the available fuel. The powerplant characteristics of primary importance are power output, fuel economy, and reliability of operation. The main fuel characteristics which are involved are detonation or knocking tendency, vapor pressure and volatility, heat of combustion, and freedom from harmful impurities.

The latter two items are taken for granted by the user. Vapor pressure and volatility, which depend on the range of the boiling points of the fuel components, control the vaporization characteristics, and consequently control such operational characteristics as fuel loss by boiling during climb, and vapor lock in the fuel supply system.

The one fuel characteristic which the producer can control, and which has come to be considered the most important, is antiknock quality, usually measured in terms of "octane number."

Fuel antiknock quality is measured by comparing it in an engine with reference fuels which have been accepted as standards.

The industry already has one new goal – the production of a fuel of considerably higher quality than 100 octane number. The finding of means to increase the production of the new fuel is the primary object of research workers all over.

The industry is already starting off on the new venture of producing fuels with the combustion characteristics required by jet propulsion engines, and future developments in engines will bring forth new fuel requirements.

At present, 94 plants are producting finished 100-octane gasoline. However, over 300 plants are producting some aviation fuel component and are thereby helping industry to meet the goals set by the Armed Forces.

Course Launched for Mars' Trainees

by CAPT. C. H. SCHILDHAUER, USNR
Naval Air Transport Service Command

■ Kansas City, June 7

(Excerpts from paper entitled "Training of Personnel for the Operation of the Mars Aircraft")

TRAINING personnel for the operation of the Mars type transport aircraft has given the Navy the opportunity to develop and conduct a program which will contribute valuable experience to airline operators who seek maximum utilization with newer and larger future aircraft.

The training program for the JRM Mars personnel falls into three phases. The first one consists of a period of indoctrination with the Mars prototype (the PB2M). This is followed by the second phase – a course at a naval training school set up at Glenn L. Martin Co. to train qualified flight and ground personnel in their respective activity with the JRM aircraft. Men learn wherein the JRM differs from the PB2M, and are drilled on newer type equipment. Upon completion of their ground course, both flight and ground crew trainees are given a practical indoctrination and checkout on the JRM, the first of which is supposed to come into the Navy's hands at about the time of matriculation of the first training class.

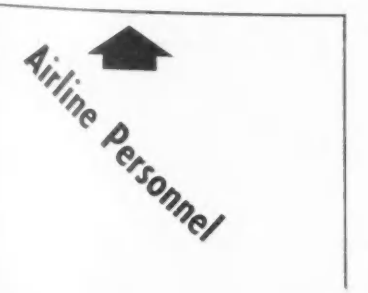
Continuous checkout on the new Mars transports by the flight crew graduates of the school at the Martin company will provide sufficient flow of trained crews to carry new aircraft to the theater of operation and to establish scheduled service in that theater with minimum delay after delivery. Ground crew graduates of the naval training school will have opportunity for indoctrination on the new type itself while at the same time maintaining it for the checkout operations of the flight crews.

A standard flight crew has evolved from operations with the Mars. It consists of one plane commander, two co-pilots, one or two navigators, two radiomen, one flight engineer, three flight mechanics, and a few orderlies.

To begin the training program with the Mars several months in advance of the time at which the airplane could be devoted solely to training operations, there was assigned for each initial plane commander, flight engineer, flight mechanic, and orderly at least one running mate as a trainee. These trainees were scheduled as extra crew members on regular trips with the Mars. It was found that maintenance activities on the Mars could contain no more than one trainee for each standard maintenance crew member. Thus, each member of the maintenance crew was supplemented with a trainee in his rate.

All courses at the naval training school contain provision for general familiarization with the airplane, its form, structure, characteristics, and equipment. Beyond that, the pilot's course is restricted to consideration of the location and operation of all systems in the plane, with particular stress upon what not to do, how to operate to conserve the equipment, and what to do in an emergency.

Operation of the Mars has highlighted the advisability of there being an officer flight engineer in the flight crew of such large aircraft. Approximately 60% of the overall total of officer and enlisted personnel required for the proposed operation of the 20 JRM type aircraft will be trained through this program. The remaining number will be trained in the course of the scheduled JRM flight and maintenance activity in the operating squadrons.



Low Traffic Potential Invites Small Transports

by WILLIS M. HAWKINS, JR.
Lockheed Aircraft Corp.

■ So. California, March 8

(Excerpts from paper entitled "Engineering Problems in the Development of A Small Transport Airplane Design")

THERE is a definite need for a small economical transport airplane for beginning airlines and airlines of small traffic potential or high frequency schedules, because it has been shown that a small airplane is more economical to operate under these conditions than larger equipment.

It has also been shown that in order to maintain this economy of operation, careful consideration to a great many details must be given by both the designer and operator of this aircraft. Too small an aircraft can be proposed for this type of service, and an operator would be in error to select an airplane of such size to support itself with a reasonable load factor. The operator must also remember that items of luxury which are relatively commonplace on larger aircraft can mean the difference between profit and loss in the operation of smaller ships and that great care must be taken in selecting the equipment for a small airplane so that the maximum economy is attained.

In analyzing the type of airplane, it was found that the first cost of the airplane represents only 10% of overall direct operating costs, and that very small increases in payload or operating efficiency of the airplane can justify very large increases in first cost.

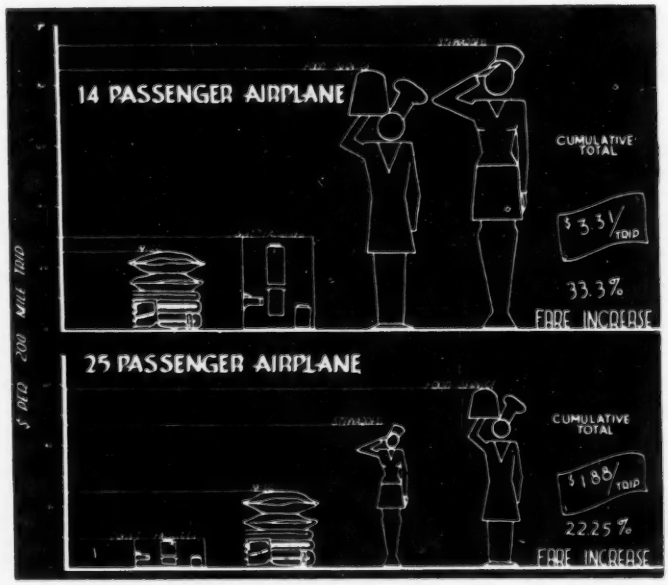
Of further interest to prospective operators is the fact that peculiar types of operation may require different variations in the layout of a small airplane. This was seen in the comparison of the airplane with different powerplants, where it was pointed out that too high a power for the airplane was detrimental in the ranges for which a small airplane will usually be used. However, the increase in power was not necessarily detrimental, and might be beneficial if longer operating ranges were assumed.

All of the engineering advancements which have been made in the last few years are not available to the designer of a small transport, and additional effort should be spent by the manufacturers of equipment, powerplants, propellers, and so forth, on the size necessary for use on such an airplane so that these airplanes may more easily compete with other transportation means over short and medium ranges.

The type and luxury of the operation of small airplanes must be controlled very closely by the operator in order to maintain the economy possible with a small airplane. The accompanying photograph emphasizes the relative importance of several luxury items to which airline passengers have become accustomed.

This photograph shows that air fares on small airplanes can increase by 30% and over if all of these luxuries are included. Such an increase in fares is incompatible with attempts to compete on an economy basis with trains and buses. If any hope is held that aircraft can compete with buses, it must certainly be predicated on "bus" type of luxury.

It is within the realm of engineering science to design a small transport airplane capable of operating within the safety regulations of the Civil Aeronautics Authority, and maintain satisfactory economy for relatively short ranges. This should provide a strong impetus toward increasing the frequency and usefulness of present schedules and the development of airlines into hitherto untouched areas.



The above photograph shows the same cost items as determined from an analysis of operating costs at the same constant load factor with a larger airplane. It is apparent from comparison of these two charts that luxury is relatively less expensive for the larger airplane

Auxiliary Power Systems Found Equal in Performance

Digest of Paper

by KARL MARTINEZ, M. M. BERRY, S. SCHNITZER and D. DeCOURCEY
Boeing Aircraft Co.

■ Kansas City, June 7

(Paper entitled "Auxiliary Power Systems for Aircraft")

DISCUSSING the rise of auxiliary power systems for aircraft, which developed from demands to reduce physical exertion of the crew, Karl Martinez, Engineering Division, Boeing Aircraft Co., who presented the paper, defined these systems as a means of utilizing energy to achieve mechanical motion at a point removed from the primary source.

The magnitude of auxiliary power requirements has grown from the time when this power was derived by purely mechanical means, said Mr. Martinez, until now there are six distinct types of generally used systems.

In his detailed analysis of these systems, which are, namely: mechanical, electro-mechanical, hydraulic, pneumatic, electro-hydraulic and electro-pneumatic, the speaker did not claim any one system as the best for performing any type of function in all cases. He suggested, rather, that in choosing a given airplane, the factors of reliability, weight, size, ease of maintenance and initial cost as well as the desired operating characteristics must be considered. The final choice, he declared, will be a compromise of these factors, and the degree of compromise will be governed by circumstances in effect for the airplane under consideration.

Mr. Martinez informed his audience that two applications of purely mechanical systems may be found in almost every aircraft: primary actuation of flight control surfaces and control of engine carburetors. He cautioned that present mechanical systems may have to be supplanted by other energy transmission means if aircraft continues to increase in size – as this would tend to make certain design problems, such as structural deflections, impossible to overcome.

Describing the electro-mechanical system, Mr. Martinez explained that energy is transmitted from the conversion point to the utilization point by means of electrical conductors. These conductors, he found, "present a relatively easy installation problem since temperature, altitude, and position have no critical effects on the operation of the system, and the high degree of flexibility of the cables facilitates initial installation and field servicing in crowded areas of the aircraft."

Another advantage he mentioned for this system is that controls in the form of electrically or mechanically operated clutches and brakes may be introduced into the final mechanical stage of the electro-mechanical system to meet desired operating conditions. Such devices, he declared, are often used to prevent overtravel of motor-driven mechanisms.

Comparing hydraulic to pneumatic systems, the speaker preferred the latter because "they employ smaller tubing, require no reservoir return line, and use a power

transmitting medium which is inherently cleaner and less susceptible to the effects of temperature, present no fire hazard, and are constantly available in unlimited quantities by virtue of the fact that the airplane flies through and is supported by this fluid." He pointed out, however, that this medium requires special provisions for removing moisture from the discharged compressed air and for lubricating many components of the system.

Energy utilization in pneumatic systems coincides with that in hydraulic systems, according to Mr. Martinez, who stated that it is accomplished by means of cylinders, air motors, and expander tubes.

Similarity was also shown between electro-hydraulic and electro-pneumatic systems. These systems, which are combinations of the electro-mechanical and hydraulic and pneumatic systems, were discovered to provide a flexible arrangement which is readily adaptable to numerous applications. "This feature," said Mr. Martinez, "is being taken advantage of in the design of larger aircraft where long runs of tubing can be supplanted by electrical wiring, expediting production installation, and reducing the vulnerability and maintenance." Thus, he asserted, the desirable features of both fluid and electrical energy can be utilized to obtain the optimum solution in many applications.

Proposed Bill Presses Licensing of Engineers

Digest of Paper

by R. D. HENDERSON
Caterpillar Tractor Co.

■ Peoria, June 11

(Excerpts from paper entitled "Some Aspects of the Licensing of Engineers")

EXPRESSING his views on current and past aspects of licensing engineers – which has long been a provocative subject – R. D. Henderson, Caterpillar Tractor Co., declared that new impetus has been given to this movement with the recent introduction of House Bill No. 337 in the Illinois State Legislature.

Provisions of this latest attempt to provide professional licenses for all branches of engineering in Illinois were compared with licensing laws of various states, and were found to have similar requirements. A specific one, quoted by Mr. Henderson, states that: "In order to safeguard life, health, and property, any person practicing or offering to practice professional engineering is required to submit evidence that he is quali-

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High Quality Aviation Oils Seen In Growth of Better Compounds

by B. M. BERRY and F. S. ROLLINS
California Research Corp.

■ So. California, Aug. 24

(Excerpts from paper entitled "Aviation Lubricating Oils")

IN the past it has been necessary for most of the emphasis to be placed on improvements in the mechanical features of aviation engines in order to provide better reliability of operation, longer overhaul periods, and lower operating costs.

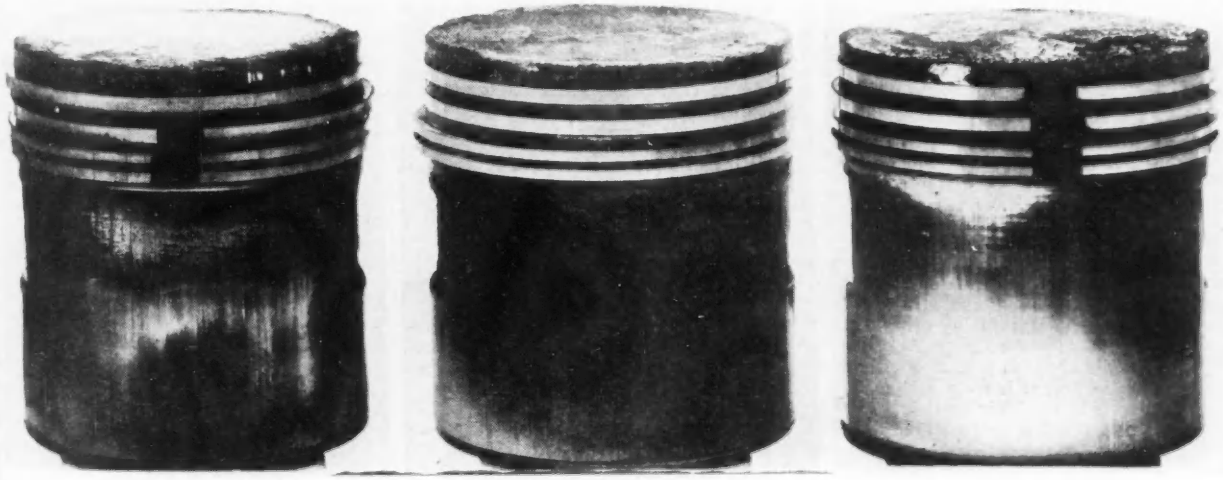
The quality of lubricants used has also been important, but when engine overhaul periods, for example, were limited by mechanical features, there was little advantage to be gained by the use of superior oils. However, the improvement in the mechanical features of aircraft engines has been so great that the overhaul periods of the engines are no longer limited mechanically, but rather by deposits and other factors controlled by the quality of the lubricant. It is therefore necessary that better oils be provided if full advantage of improved mechanical features is to be obtained. Some improvement can be accomplished by selection of crudes and refining processes, but much greater improvement is possible by the use of chemical additives which enhance the properties of even the oils having the best natural characteristics.

It is anticipated that the most effective research on aviation oils will be in the development of better compounds for use in selected base oils, and that in the near future all high quality aviation oils will be of this type.

Leading to this conclusion were a series of laboratory tests, in which a Wisconsin 1-cyl aircooled engine, a Cooperative Universal engine equipped with a Wright G-200 engine cylinder assembly, and a Menasco multicylinder, aircooled aviation engine were used in investigating the performance of aviation oils.

The performance of three commercial aviation oils, C, D, and E, was investigated in the Wisconsin engine and the same oils were tested in full-scale aviation engines. Oils C and D are uncompounded specification oils and oil E is a compounded lubricant. Results obtained in the Wisconsin engine are shown in the accompanying photograph. It may be noted that the compounded oil was superior from the standpoint of piston deposits and was the only one which prevented ring sticking. It is evident, therefore, that engine performance could not be predicted from physical properties.

Tests were conducted with compounded oil E in the training planes of one of the major airlines and in single and multicylinder engines in the laboratories of several engine manufacturers, under conditions that were much more severe than normal commercial operation. Laboratory tests showed that the operating time could be extended several hundred per cent with this oil before operating trouble was encountered, as compared to that experienced with an uncompounded oil.



Oil C
Uncompounded
60 hr
1 Ring Stuck

Oil D
Uncompounded
30 hr
3 Rings Stuck

Oil E
Compounded
60 hr
No Rings Stuck

T&M METHODS

Offered for Peace Era Stem from War's Travail

by R. O. Snodgrass

IDEAS born of wartime exigencies will be used to groom the transportation and maintenance industries for their peacetime roles, according to engineers who addressed over 85 persons at the Northwest Section T&M Local War Emergency Meeting Sept. 15, in the Edmond Meany Hotel, Seattle. The presage of better vehicles and their components as a result of this transition lent a note of well-founded optimism to the all-day session.

The first speaker to offer these predictions was H. E. Simi, bus manager, Kenworth Motor Truck Corp., whose suggestions on "Post-War Bus Design" were based upon plans being formulated in his organization. Profiting from the experience of past weaknesses, Mr. Simi urged that "the design of buses must take into consideration the powerplant first of all, for only that way can the design of the body be attempted. Other things to be given preference are: type of spring mounting, location of power unit, driver vision and comfort, ventilation and heating system."

He stated further that he likes the rod spring type of mounting better than the conventional spring because the overall weight of the vehicle could be reduced by several hundred pounds to increase payload with better efficiency. He favors the elimination of curved windows in the bus, ventilating and heating systems in the floor rather than over head, and metal rather than wood floors due to easier cleaning and less retention of obnoxious odors, such as those from cigarette butts.

One important requisite which the war brought home to Earl B. Richardson, superintendent of equipment, Portland Traction Co., and his colleagues, and which they are putting into practical operation, is a streamlined maintenance program.

Admitting that during the war transportation companies had things all their way as far as customers were concerned, Mr. Richardson warned that the business is now beginning to feel the competition of private automobiles due to the lifting of gasoline rationing. "In the postwar era," he declared, "we shall have to provide a package that appeals to people; it must be comfortable, and must be mechanically right. Management will demand low cost upkeep which can and must be accomplished by tearing apart their present methods of upkeep and formulating new ways and means of obtaining the maximum results with the least expenditure of manpower and capital."

About his operations, Mr. Richardson said: "We have tried various systems and have found that by soliciting the confidence and cooperation of our key personnel, we have found many shortcuts in order to keep our buses on the road, rather than in the shop." He described one main feature as the production line, where an inspector has a unit and the bus is moved along this line and each inspector is responsible for certain parts of the bus. He explained also how the elimination of needless forms and card indexes has speeded up the inspection of the vehicle, thus allowing it to be put back into service with the least delay.

Mr. Richardson's concluding remark was in the form of a minor bombshell, when he pressed the adoption of the metric system for weights and measures. "We stand practically alone among the nations of the world in our maintenance of an old complicated system . . . the SAE should go on record for the metric system," he stated.

A war emergency measure which has shown exceeding promise for future use is the synthetic tire, asserted A. L. Crandall, field service engineer, U. S. Rubber Co., who presented the paper on "Field Performance – Synthetic Truck Tires" prepared by R. A. Blake, general service manager, same company.

"The success of the synthetic tire in heavy-duty operation, which has been very good, has been accomplished only by the cooperation of operators in caring for them and keeping the correct air pressure plus careful matching of tires and equal weight distribution on the vehicle," he said. Mr. Crandall found that in many applications synthetic rubber is superior to the natural product, and sees it "remaining with us even after crude rubber is again available."

SAE Accepts ODT Offer To Distribute Reports

IN reply to a generous offer of the Office of Defense Transportation, the Society has agreed to distribute Government-printed copies of SAE-ODT Coordinating Committee reports on motor vehicle maintenance.

W. J. Cumming, was head of the Maintenance Division of ODT, under whose direction the reports were reproduced by the Government Printing Office.

Copies of these 11 reports are available free from SAE Headquarters, 29 West 39 Street, New York 18, N. Y. Send for a list of these titles.

Aero Exper of New Ligh

ADVANCED engineering thinking was given sweeping stimuli on Oct. 4 at the SAE Southern California Section Victory Aeronautic Meeting, when more than 500 members and guests probed deeply into today's developments and searched the horizons of technology for trends of tomorrow. With geared propeller, the gas turbine will be on hand with a 10,000 hp unit when needed.

The meeting, opened under the chairmanship of J. L. Atwood, SAE vice-president, offered 14 full-scale prepared technical papers, numerous written discussions and lively from-the-floor questions and answers in a rapid-fire, all-day meeting at the Biltmore Hotel in Los Angeles. The program took on a national flavor with speakers from coast to coast, many of whom emphasized keener appreciation of the deterrent factor of weight, and most of them agreed that closer coordination between aeronautic engineering specialists is the industry's challenge to its own engineers today.

In several respects the meeting was keynoted by the paper on Shop Aspects of the New High-Strength Aluminum Alloys. Here the authors, Roy A. Miller, chief structural research engineer, and Max E. Tatman, chief metallurgist of Consolidated Vultee Aircraft Corp., went to the root of the problems of fabricating the new hardened alloys, and looked forward to universal use of these – and successively better – light metals.

Superior mechanical properties of these

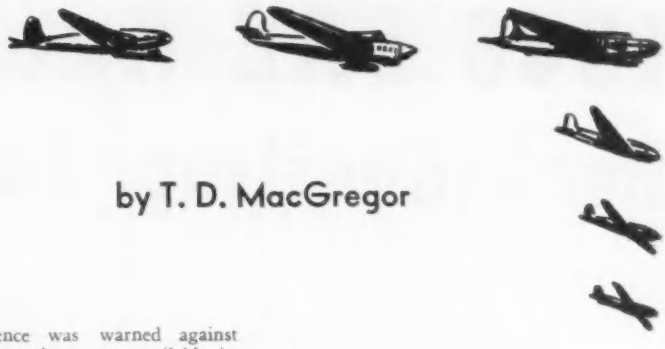
Bearing developments have also resulted from restricted materials, declared R. A. Watson, sales and service engineer, Federal Mogul Corp., principal speaker of the day, who explained to the group the various materials from which bearings were made prior to the emergency as well as what was done during the war to provide industry with bearings when several of the metals were critical.

Blending Brings Good Results

By blending certain metals together, good results can be obtained even under extreme operating conditions, although, according to Mr. Watson, certain metals were unsatisfactory because corrosion sets in at higher crankcase temperatures. Silver used for aircraft bearings was discussed, as well as its possible future use for trucks and buses.

The speaker disclosed that: "While industry has always accepted the high tin-base babbitt bearing as the best all-around bearing, we have found that the high lead babbitt bearing has many advantages, the chief one being availability, and that even after the war this type of bearing will remain on the market." He extolled the quality of aluminum bearings, thousands of which had

Probe Horizons Materials, Jets



by T. D. MacGregor

new alloys can only be obtained, they warned their overflow audience, by advanced techniques which obsolete former shop practices. They recommended that detail parts of precipitation hardening aluminum alloys be formed in the "as-quenched" solution heat-treated condition.

These high strength aluminum alloys must not be joggled, dimpled, formed, or reworked when in the precipitation hardened condition *unless* accurately controlled heated tool methods are used.

Following a careful report on the metallurgy and mechanical properties of these superior alloys, the authors discussed in some detail the heat-treatment and cold working of the material. They offered a table of aging cycles, at stated temperatures and periods of time; a tabulation of mechanical properties; another of bearing strengths, and solution heat-treatment temperatures.

Design engineers were introduced to forging practice, and were warned to give careful consideration to all forms of forging calculated to result in the best possible part made from these hard alloys. In general, forming, joggling, dimpling, and reworking should be performed on these materials in the unaged condition.

Methods of attachment came in for another careful discussion, and comparisons were made of the results of like operations to different alloys, again in tabular form for ready reference and clear guidance. Although a riveting method is being developed, the audience was warned against using it until more data were available in respect to the occurrence of cracking.

The aged alloys appear to machine as well as the older, unaged materials, although the authors admitted a paucity of experience in machinability. If possible, they said, machining should be done in the unaged condition, and in the case of 75S-W, as soon after the solution heat-treatment as possible to hold straightening difficulties to a minimum.

Often assembly aging of a subassembly is desirable, but design and production engineers were warned against this practice if the unit contains certain materials such as plastics, rubber, other synthetics, fiber parts, lubricants – such as in bearings in the assembly – solvents, and cements. Furthermore, magnesium alloy parts, if in the hardened condition, are annealed by the aging process, and warning was made against inclusion of parts of metals having greatly different coefficients of expansion.

In general, it appears that finish requirements are not changed by the aging heat-treatment, the authors said.

Inspection a Problem

Inspection of these harder alloys remains a problem. No conclusive nondestructive test to determine the exact degree of hardening is known to the authors, they admitted. As a result, close furnace control is essential at this stage of the art.

Citing the pioneering work which enormously advanced in improvement of aluminum alloys for aircraft structures, J. F. McBrearty, structural engineer of Lockheed Aircraft Corp., reported on what he termed the "second phase" of this development which did much to help win the war for the Allied nations. He agreed with the previous authors that the designer must change some of his older concepts to take full advantage of these better aluminum alloys. His paper was on Utilization of the New High Strength Aluminum Alloys.

Economically, he said, any new material must compete favorably with others on the "technical data scoreboard" before its inherent advantages can be realized.

He recalled, that when considering the potentialities of any new material, or even one claiming improvements of its older counterpart, the aircraft structural engineer must keep indelibly in mind these required properties: tensile strength, yield strength – both in tension and compression, elongation, tangent modulus of elasticity, fatigue strength, and the production and processing limitations. Also important, in specific cases, are shear and bearing strengths, resistance to impact, corrosion, temperature, shellfire, and, of course, cost. He offered a complete stress-strain graph of the 14 materials he discussed, from which the tensile and yield strengths, elongations, and moduli are apparent or from which they could be derived.

The importance of knowing more about these materials, he concluded, is shown in estimates of from 10 to 20% increased payloads on long range flights – an economic consideration of prime importance.

These two papers were followed by a question and answer forum conducted by the authors, L. P. Spalding, chief research engineer, North American Aviation, Inc., and H. M. Harrison, Lockheed Aircraft Corp. Kirby Thornton, Aluminum Co. of America, presided at the morning symposium on High Strength Aluminum Alloys.

The other morning session was a Symposium on Refueling, and was conducted by Ivar Shogran, Douglas Aircraft Co., Inc., when six authors presented four papers on this important phase of commercial air line operations.

Again, strong pleas for coordinated study representing, in this case, aircraft companies, commercial operators, airport designers and air field management, insurance companies, refueling equipment manufacturers, and competent military and civil government authorities, were made. One author suggested a program of standardization. In agreement, two other speakers solicited the cooperation of engineers and experts in various fields to attain greater safety and more economy in refueling by coordinating their experiences.

Russell M. Secrest, staff engineer, Pan American Airways, predicted refueling operations at night while airline passengers are asleep. The trend toward larger craft indicates that under-the-wing refueling facilities will become more general than at present, and he suggested the adoption of a dry hose method in conjunction with self-sealing couplings as a safety measure.

The trend to larger ships may call for as much as 5000 gal of fuel at the point of origin, and from 2000 to 3000 gal at intermediate stops. Efficiency will demand hose capacities of from 150 to 200 gal per min, and he believes that the tank trucks now used at large airports will be inadequate but will be converted to use at the intermediate stops.

C. S. Brand and W. C. Wold, Consolidated Vultee Aircraft Corp., were in agreement with Mr. Secrest in their own detailed analysis of the problem of airliner refueling. In view of the trends toward larger craft and the long range routes contemplated by aircraft manufacturers and operators, they said, it will be necessary to discard practices that have served to date.

Unless design of refueling facilities at air-

turn to p. 58

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been in use on large diesel tractor engines, in Russia and elsewhere, and which were as good as new after many hours of use.

Silver bearings, on the contrary, were declared impractical for automotive use, for "cost was high due to the necessity of coating with lead and indium." Silver is also a poor bearing material, Mr. Watson found, due to poor embeddability and oiliness characteristics, and it is not suitable because of high coefficient of expansion.

War Increased Bearing Life

Taking exception to these views, W. W. Churchill, superintendent of operation and maintenance, Washington Motor Coach Co., Inc., said: "Regardless of the cost of silver bearings, if they will give the operator increased bearing life in the vehicle, industry will gladly pay the extra cost. Bearing life has been increased during the war (using wartime high lead babbitt) by better care of the vehicle, more complete operating instructions for the operator, and better oil filtering."

Pleasant respite between afternoon and evening sessions was dinner held in the hotel's ballroom, which was attended by 120 persons.

1946 SAE Annual Meeting
Book-Cadillac, Detroit, Jan. 7-11

HENRY FORD II, new president of the Ford Motor Co., will be the principal speaker at the Banquet which will highlight five days of outstanding technical sessions and committee meetings during the SAE 1946 Annual Meeting in Detroit. W. J. Davidson, SAE past-president and director of engineering service, General Motors Corp., will serve as toastmaster at the Banquet, to be held at the Detroit Masonic Temple, Wednesday, Jan. 9. The technical sessions will be held, as usual, in the Book-Cadillac Hotel.

PASSENGER CAR SESSIONS Spirited symposiums on two of the hottest subjects discussed today by automobile engineers – automatic transmissions and vehicle suspensions – are scheduled. Many of the ingenious developments made in these fields during the war will be introduced and discussed at these sessions.

TRUCK & BUS SESSIONS Engineers will peer into the future in one of these sessions with its outstanding papers on trucks, buses, and highways of tomorrow. Brake problems will be focussed upon at another, and an airplane engineer will give results of his work in this field of structural engineering.

AIRCRAFT POWERPLANTS Practical, down-to-the-earth design details of jet propulsion powerplants, withheld for security reasons during the war, will be divulged in a symposium. Dr. W. Hawthorne, British Air Ministry, will speak. Performance characteristics of the German ME-262 powered by the Juno 004, will be a feature offered by the Air Technical Service Command.

AIR TRANSPORT SESSIONS One of these will summarize recent engineering advances in this new industry. European air line operations will be reported, and spectacular American advances will be reviewed. All-weather flying symposium is expected to advance the day of dependable scheduled air transport.

AIRCRAFT ACTIVITY Two sessions sponsored by this group will feature new concepts of thrust and drag for jet propelled aircraft, composite powerplant airplanes, and latest developments on anti-icing and exhaust systems.

DIESEL ENGINES Results of fundamental research and spectacular motion pictures will bring automotive engineers up to date at the two outstanding Diesel Engine sessions planned for the 1946 SAE Annual Meeting.

TRANSPORTATION & MAINTENANCE Engineering and economics will be combined and focussed upon problems of vehicle retirement at one of two symposiums. Latest methods of cleaning commercial vehicles from stem to stern will be reviewed at another, both sponsored by the T & M Activity.

MATERIALS SESSIONS Will natural rubber take its former place in vehicle parts, now that it is becoming available? This and other questions on the natural and synthetic rubber outlook will be answered by leading rubber experts at one of the two Materials Sessions. Methods for specifying materials, substitutes for tin, and non-petroleum lubricants will be covered in other papers.

FUELS & LUBRICANTS At a symposium on the field performance of detergent oils, petroleum technologists will continue their spirited clashes on this controversial subject, continuing the investigations explored at the November National F & L Meeting in Tulsa. Another session will feature gasoline gum tolerance and reference fuels.

STANDARDS SESSION Involute spline standardization, a project vital in automotive engineering, will be furthered in the Standard Session which is scheduled to close the 1946 SAE Annual Meeting in the Book-Cadillac Hotel, Detroit, Feb. 7 to 11.

SAE Annual Meeting DINNER

Fountain Room, MASONIC TEMPLE, 500 Fountain Street

HENRY FORD II

6:30 P. M. WEDNESDAY FEBRUARY 9

W. J. Davidson **Toastmaster**

Licensing Engineers

cont. from p. 29

fied to practice and to be registered as hereinafter provided."

"Evidence" was interpreted as meaning a degree from a recognized engineering school plus four years of professional engineering experience or eight years of professional experience. Although it was asserted that a written examination is required, the applicant can receive a certificate of registration without examination upon paying a fee of $10 – if he can prove within one year after the Act becomes effective that he is practicing professional engineering, has been a resident for at least a year, and is of good moral character. Mr. Henderson remarked, however, that after one year examination becomes necessary.

Laws of most states, the audience was informed, apply solely to those corporations offering their services to the public as professional engineers; but some states stipulate that companies with engineering departments have at least one licensed professional engineer.

Exemptions Cited

The only complete exemptions from the proposed licensing law, Mr. Henderson declared, would be for those "services performed by employees of a company engaged in manufacturing operations, or by employees of laboratory research affiliates of such a manufacturing company, which is incidental to the manufacture, sales, and installation of the products of the company."

After his clear analysis of Bill No. 337, the speaker went on to describe the work of the National Council of State Boards of Engineering Examiners, whose function he said it is to facilitate reciprocal registration among states, based on qualifications that will meet all state laws. While no certificate issued by the Council is binding on a state board, Mr. Henderson disclosed that all but three of the member boards have agreed to accept Council certificates along with an endorsement by a state board as sufficient proof for issuing a regular state certificate. This method, he pointed out, spares an individual moving from one state to another the necessity of re-registering.

Background of Laws

Mr. Henderson preceded this account with a history of licensing laws – which began as far back as 1907 when the State of Wyoming made it mandatory to secure a license to practice professional engineering. He told of a steady increase since then in enactment of these laws, asserting that the present total of states requiring licensed engineers is 46, Montana and New Hampshire being the exceptions. The laws of all but four of these states – including Illinois, which exercises control over structural engineers only – embrace all branches of engineering, it was stated.

Engineers' reaction to being certified appears to be enthusiastic, the speaker observed, with nearly 75,000 having already applied for and secured licenses in the states and territories which have laws in effect.

SAE National

AIR TRANSPORT

Engineering Meeting

Edgewater Beach Hotel, Chicago ■ **December 3-5**

MONDAY, DEC. 3

MORNING

Flight Engineer Station Design
– M. F. Vanik, Boeing Aircraft Co.

Control Decks for Long-Range Aircraft
– Capt. H. J. Chase, Pan American Airways, Inc.

AFTERNOON

Emergency Equipment for Overwater Air Transport
– John G. Borger and R. O. Jacobsen, Pan American Airways, Inc.

Provisions for Overwater Operation
– Frank R. Canney, Boeing Aircraft Co.

EVENING

Airport Terminal Design
– Albert F. Heino, United Air Lines, Inc.

Latest Developments in Airline Ground Servicing Equipment
– Harry S. Pack, P-V Engineering Forum, Inc.

TUESDAY, DEC. 4

MORNING

Air Transport Command Cargo Loading Experiences
– Major David W. Long, Air Transport Command

Airlines' Air Cargo Problems
– M. B. Crawford, United Air Lines, Inc.

AFTERNOON

Passenger Cabin Design as Affected by Maintenance Requirements
– R. W. Rummel, Transcontinental & Western Air, Inc.

Psychological Requirements of Passenger Cabin Design
– Dr. Howard K. Edwards, Eastern Air Lines, Inc.

EVENING BANQUET

WEDNESDAY, DEC. 5

MORNING

Refrigeration for Air-Conditioning Pressurized Transport Aircraft
– Bernard L. Messinger, Lockheed Aircraft Corp.

Fluorescent Cabin Lighting for Transport Airplanes
– Raymond A. Rugge, Curtiss-Wright Corp.

AFTERNOON

A System Specification for Air Navigation and Traffic Control
– Capt. S. P. Saint, American Airlines, Inc.

Transoceanic Air Navigation
– Capt. H. G. Gulbransen, Pan American Airways, Inc.

Executive Changes at Wright

About SAE

Burdette S. Wright

Raymond W. Young

W. G. Lundquist

Among recent executive changes announced by **GUY W. VAUGHN**, president, Curtiss-Wright Corp., include the assignment of **BURDETTE S. WRIGHT** from the management of the Airplane Division at Buffalo to the New York City headquarters on reconversion problems, and the resignation of **G. M. WILLIAMS** as executive vice-president of Wright Aeronautical Corp. to return to the presidency of Russell Mfg. Co., Middletown, Conn., from where he has been on a leave of absence since December, 1941. **RAYMOND W. YOUNG**, who as chief engineer of the corporation directed the development of the Wright Cyclone 18, powerplant for the B-29 Superfortress, has been appointed a vice-president of the concern. He is vice-president of the Society for Aircraft Engine Engineering. Succeeding Mr. Young, **W. G. LUNDQUIST** has been appointed chief engineer.

LT.-COL. B. J. LEMON, Ordnance Department, whose return to inactive status was announced in the August SAE Journal, has rejoined the Commercial Development Department of the U. S. Rubber Co., New York City.

HAYDEN B. RUSSELL is now the owner of the Russell Engineering Co., Hollywood, Calif. He was formerly vice-president of Aero-Units, Inc., Newark, N. J.

COL. FREDERICK C. HORNER, a former SAE Councilor, is returning to General Motors Corp. as director of the field operations section of the corporation's Distribution Staff, with headquarters in Detroit. Shortly after Pearl Harbor, at the request of the War Department, Colonel Horner left General Motors to organize and operate the Highway Division, Transportation Corps, Army Service Forces. Previous to that, he was assistant to the chairman of General Motors on transportation matters. After going on inactive status early this year, he was called in by the War Production Board as consultant on highway transportation problems.

Col. Frederick C. Horner

GEORGE A. GREEN, one of the automotive industry's most prominent engineering figures over many years, writes SAE Secretary and General Manager John A. C. Warner that he is currently in Rome, Italy, attached to the State Department, and acting as economic adviser to the American ambassador to Italy, Alexander C. Kirk. Mr. Green has the rank of Minister.

"I travel quite a lot," Mr. Green writes, "and have visited most of the important cities as far as Trieste in the North and Naples in the South. . . . I may be back to the USA around Christmas on a visit."

Mr. Green is best known in the industry as a former vice-president in charge of engineering of the GMC Truck & Coach Division, General Motors Corp.

WILLIAM D. GROSECLOSE is now chief draftsman with Librascope, Inc., Burbank, Calif. He was formerly hydraulic development engineer with Bendix Aviation Corp., Pacific Division, Los Angeles.

DON B. WEBSTER has been named head of the Mechanical Laboratory of Packard Motor Car Co., Aircraft Engine Division, Toledo, Ohio. He was formerly resident engineer at Packard Motor Car Co., for Continental Aviation & Engineering Corp., Detroit.

A postwar personal airplane, the Ercoupe, developed by **F. E. WEICK** and Henry Berliner at the Engineering & Research Corp. of Riverdale, Md., has been offered to the airminded public by R. H. Macy's Co., New York City. The plane, described as "certified spinproof," sells for $2994 and is an all-metal, low-wing monoplane.

Formerly engineer in the Toledo, Ohio, branch of Packard Motor Car Co., **G. A. SPRAGUE** is now powerplant engineer in the Detroit, Mich., branch of the firm.

KARL M. WISE, since 1938 director of engineering of Bendix Products Division, Bendix Aviation Corp., has retired from the company as of Oct. 1. He joined the firm in 1934, having been director of engineering with Pierce-Arrow Motor Car Co., and serving as executive engineer of Studebaker Corp., assistant chief engineer of Olds Motor Works, and Chalmers Motor Co., among other pioneering automotive concerns. Joining the Society in 1919, Mr. Wise has served on a number of technical committees and has served for two years as vice-chairman of SAE Buffalo Section. Upon his graduation from the University of Michigan with a degree of B. S., he entered the automotive industry as a draftsman with the Federal Mfg. Co., Cleveland, in 1904. He then joined the Wayne Auto Co., Detroit, and spent several years as metallurgist with vehicle manufacturers and with the Crucible Steel Co. of America. He served as SAE vice-president for the Passenger Car Activity Committee in 1941.

Karl M. Wise

COL. AL BODIE has been elected vice-president, serving in the capacity of works manager, of the Otto K. Olesen Corp., Hollywood, Calif. Shortly after he returned from overseas where he served with the U. S. Army Air Forces in the Mediterranean and C.B.I. theaters of war, Colonel Bodie opened offices in Beverly Hills, Calif., as a consulting engineer. He terminated his activities along this line to accept the vice-presidency of the Olesen organization.

MAJOR F. G. CLARKSON, after serving for four and one half years on the Technical Staff of the British War Office, is now associated with the Technical and Sales Department in Great Britain of Warner Electric Brakes. Major Clarkson also holds the position of managing director of the Stevenage Motor Co., Ltd., Stevanage, Herts., England.

GEORGE V. CANDLER, JR., has been appointed to the staff of the president of the Chrysler Corp., Export Division, Detroit.

Members . . .

E. M. SCHULTHEIS, in charge of automotive equipment sales in the Detroit office of Clark Equipment Co., has been appointed manager of automotive sales for the company. Mr. Schultheis will make his headquarters in the company's general offices in Buchanan, Mich. 1945 secretary of SAE Detroit Section, Mr. Schultheis has been very active on many SAE committees. He is a past vice-president representing the Truck and Bus Engineering Activity Committee.

E. M. Schultheis

ROBERT H. CLARK, a past-chairman of SAE Metropolitan Section, has been reassigned to the transportation department of the Consolidated Edison Co. of N. Y., Inc., as general superintendent of transportation. The System embraces the New York metropolitan area except Staten Island and includes Westchester and Yonkers.

PHILIP B. TAYLOR, who resigned as vice-president and general manager of the Wright Aeronautical Corp. last June, is now conducting a survey of combustion turbines for Pan American World Airways, Inc., New York.

Formerly chief engineer with Firestone Rubber & Metal Products Co., Wyandotte, Mich., J. S. BEECHLER is now a manufacturer's agent with offices in Detroit.

Formerly layout draftsman, Packard Motor Car Co., Detroit, CLARENCE FURST is now major layout man with Graham-Paige Motors Corp., same city.

WILLIAM L. BATT, War Production Board vice-chairman, has been appointed chairman on an interagency committee to deal with the problem of U. S. synthetic rubber facilities. Membership will represent the War, Navy, State, and Justice Departments, and the Surplus Property Board.

Formerly liaison engineer with Wright Aeronautical Corp., Cincinnati, Ohio. MAURICE DAMS is now a student engineer at the Grand Rapids Stamping Division of General Motors Corp., Grand Rapids, Mich.

J. J. DZIEWONSKI has become associated with the Turkish Air League of Ankara, Turkey, where he is heading a technical planning mission sent by that organization to London for the De Havilland Engine Co., Ltd. His responsibilities include the adaptation of license documents such as drawings and operation layouts to requirements of production in Turkey, the ordering of all necessary equipment, and ultimately, the putting of the plant into operation. Mr. Dziewonski relinquished his post of technical adviser to Headquarters, Polish Air Force in London, to take his new position with the Turkish Air League.

EMMETT W. HAUTH, formerly field representative in the San Antonio, Tex., branch of General Motors Corp., is now a representative, Chevrolet Motor Division, GMC, Des Moines, Iowa.

Formerly senior test engineer with Wright Aeronautical Corp., Lockland, Ohio, CEYLON ROUSE is now an engineer with the Kermath Mfg Co., Detroit.

Formerly at Camp Blanding, Fla., CAPT. ROBERT D. HARVEY, U. S. Army, is now stationed at Fort Sam Houston, San Antonio, Tex.

Willys-Overland Appointments

Announcement of the appointment of PHILLIP C. JOHNSON as administrative assistant and WALTER F. BENNING as chief engineer of the chassis division, Willys-Overland Motors, Inc., was made recently by DELMAR G. ROOS, vice-president in charge of engineering. In his new position, Mr. Benning will handle all technical and design problems incident to developing chassis for the company's entire line of automotive vehicles. Assisting him will be CHARLES CUMA, formerly with Atlas Imperial Diesel Engine Co. As assistant to Mr. Roos, Mr. Johnson will supervise experimental production and experimental shops, labor relations, the quality engineering group, and the specifications division. ROBERT H. GREEN has been named agricultural engineer. Mr. Green, who had been credited with the development of a number of farm appliances, will cooperate with agricultural equipment manufacturers in connection with Willys' production of the new Universal Jeep for civilian use. E. C. DeSMET remains as chief engineer of the body division, while D. D. STONE and ROGER F. MATHER continue as director of research and chief metallurgist and chemist, respectively.

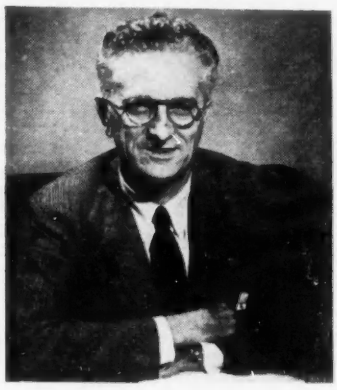
Formerly junior engineer, CARROLL S. EIAN is now associate engineer with the National Advisory Committee for Aeronautics.

ROY W. VORHEES, JR., is now on special assignment at the Plymouth Motor Car Division of Chrysler Corp., Detroit. He was formerly chief liaison engineer at the Dodge Chicago Plant, Division of Chrysler Corp., Chicago.

W. J. DAVIDSON (right) has been made administrative officer for the projected twenty-million dollar General Motors Technical Center at Detroit, GM Vice-President C. L. McCUEN has announced. A. J. SCHAMEHORN (left) whose return to General Motors from Army Ordnance was noted in the September *SAE Journal*, will be assistant administrative engineer.

In his new post, Mr. Davidson, who was president of the SAE in 1939, will have supervision over the construction, equipment and maintenance of the vast new Technical Center which will cover 350 acres and will house the corporation's advanced engineering section, its research laboratories, its process development section and its styling section. He brings to his new tasks a broad experience in many areas of GM's widespread operations. He joined Cadillac as a junior engineer in 1914, served as a captain in the Motor Transport Corps during World War I, was subsequently associated with GM's Canadian operations, was executive secretary of the general technical committee under whose direction the GM Proving Ground was built, and has filled other important executive and engineering posts. During World War II he has been director of engineering service for war products.

Wright Awarded Medal



THEODORE P. WRIGHT, administrator of the Civil Aeronautics Administration, has been selected to be awarded the Daniel Guggenheim Medal for the year of 1945. The medal, aviation's highest honor, will be presented to Mr. Wright "for outstanding contributions to the development of civil and military aircraft, and for notable achievement in assuring the success of our wartime aircraft production program."

He is well known for the many articles and papers he has written on Aeronautical subjects. At the invitation of the Royal Aeronautical Society, he delivered in London last May the Wilbur Wright Memorial Lecture. Recently he and **WILLIAM A. M. BURDEN,** assistant secretary of commerce for air, presented a broadcast entitled "Our International Civil Aviation Policy." In 1940, Mr. Wright, a former SAE Councilor, resigned from his post of vice-president and director of engineering of Curtiss-Wright Corp. to enter Government service.

F. SERGARDI is now a consulting engineer with offices in Grosse Pointe, Mich. He was formerly head mechanical engineer, U. S. Army Signal Corps, Fort Monmouth, Red Bank, N. J.

Formerly test engineer with Curtiss Propeller Division, Curtiss-Wright Corp., Caldwell, N. J., **JAMES T. COLIZ** has been promoted to the position of design engineer.

ARTHUR E. LUX is now field engineer and designer with the Caterpillar Tractor Co., Peoria, Ill. He was formerly a checker with the same company.

Earl Bartholomew

John B. Macauley, Jr.

CHARLES E. NEUMANN has been named sales engineer in charge of sales, G. S. Alverson Co., New York City. Mr. Neumann was formerly field engineer with Eclipse Aviation, Division of Bendix Aviation Corp., Teterboro, N. J.

GORDON L. WOOD, who had formerly been category authorizer, Oil Controller's Office, Ottawa, Ont., Canada, is now associated with the tire, truck and car rationing division of the Wartime Prices and Trade Board, same city.

For several years an engineer with American Airlines, Inc., Municipal Airport, Jackson Heights, L. I., N. Y., **TED C. NING** is now in the sales transport department of Fairchild Aircraft, Division of Fairchild Engine & Airplane Co., Hagerstown, Md. He took post-graduate work at the University of Michigan and Ryan School of Aeronautics.

DALE D. BALDRIDGE is now foreman of the U. S. Forest Service, Department of Agriculture, Willows, Calif. He was formerly foreman of the Patterson Branch Shop, with the Service, in Patterson, Calif.

Reappointment of **FELIX DORAN, JR.,** as general manager of the Fleet Division of General Motors Corp., was announced recently by **C. E. WILSON,** president of the corporation. Mr. Doran returns to his former position after two and one half

Felix Doran, Jr.

years of service as a lieutenant colonel with the Ordnance Department at Rock Island Arsenal. He joined Chevrolet Division in Texas in 1919, and except for his military service, has been with General Motors since that time. **W. L. SHAFFNER,** who has been acting General Manager, resumes his position with the corporation as director of National Users' Sales.

JOHN B. MACAULEY, JR., has been appointed director of engineering research for Ethyl Corp. to succeed **EARL BARTHOLOMEW,** who becomes general manager of research laboratories. Mr. Macauley, who is widely known for his contributions to the coordination of fuel and engine research, had been chief of applied research for Pratt & Whitney Aircraft for the past two years and for many years was chief of the engine laboratory of the Chrysler Corp. Past-chairman of several SAE committees. Mr. Macauley is very active in SAE research work. Mr. Bartholomew has been associated with Ethyl Corp. since 1926, serving since 1927 as director of engineering research. A graduate of the University of Oklahoma, he taught mechanical engineering there for one year and at Harvard University for three years. Mr. Bartholomew is a member of the Fuels and Lubricants Activity Committee.

REX D. ROWLAND is now the owner of Rowland Clipper Sales Co., Everett, Wash. He was formerly transportation examiner, Office of Defense Transportation, Motor Division, Seattle, Wash.

CAPT. A. C. HANSON, U. S. Army, has been assigned to the Materials Branch, Research & Development Service, Office of the Chief of Ordnance, Washington, D. C. He was formerly assistant laboratory officer, Rock Island Arsenal, Rock Island, Ill.

PAUL C. ROCHE, sales engineer, Nosco Plastics Division, National Organ Supply Co., Erie, Pa., was elected secretary of the Northwestern Pennsylvania Section of the Society of Plastics Engineers last August.

Formerly coordinator of production and chairman of the Production Board, Department of Munitions and Supply, Ottawa, Ont., Canada, **H. J. CARMICHAEL** is now associated with the Conroy Mfg. Co., Ltd., St. Catherines, Ont.

SIDNEY M. GAMSU has been appointed chief engineer of the McCauley Corp., Dayton, Ohio. He recently resigned from the staff of Peter Altman, Engineering Consultant, Detroit, to accept this new position.

Formerly senior methods engineer with Sperry Gyroscope Co., Inc., Great Neck, L. I., N. Y., **RICHARD E. CREDE** is now affiliated with the Automatic Tool & Engineering Co., New York City.

SIDNEY GLASS has resigned as production salvage engineer with Lockheed Aircraft Corp., Burbank, Calif., and is now a design draftsman with Winfield Carburetor & Mfg. Co., Los Angeles.

Recently released from active duty with the U. S. Army, **MAJOR GEORGE H. SCHOENBAUM** has resumed his former position with the Standard Oil Co. of N. J. While in the Army, Major Schoenbaum was chief of the demobilization branch Fuels & Lubricants Division, Quartermaster Corps, Office of Quartermaster General, Washington.

Formerly design engineer with Busch-Sulzer Bros. Diesel Engine Co., St. Louis, Mo., **HAROLD MINGES** is now layout engineer with Baldwin Locomotive Works, Philadelphia.

L. G. SROGI has been named senior mechanical engineer with Packard Motor Car Co., Toledo Division, Toledo, Ohio. He was previously design engineer with Studebaker Corp., South Bend, Ind.

DR. CHARLES L. THOMAS has been appointed director of research of the Great Lakes Carbon Corp., Chicago. He joined the research staff of the corporation recently after serving 14 years in the Research & Development Laboratories of the Universal Oil Products Co.

Dr. Charles L. Thomas

MILO M. DOLSTAD has resumed his position as assistant professor of mechanical engineering at the University of Missouri, Columbia, Mo. He has been on leave of absence from the university to work with the U. S. Engineers at Santa Fe, N. Mex.

Until recently engineer and Wright Field technical representative, Adel Precision Products Corp., Burbank, Calif., **ORRIN R. BROBERG** has been appointed chief engineer at the Marine Division of Ellinwood Industries, Ltd., Los Angeles.

JULIUS DUSEVOIR, formerly experimental engineer with Stout Research Division, Consolidated Vultee Aircraft Corp., Dearborn, Mich., is now project engineer in the design engineering department of the Nashville Division of the same company.

After two years as research engineer at the atomic bomb plant at Los Alamos, N. Mex., **GEORGE D. CREMER** is returning to his former employer, the Hardy Metallurgical Co. of New York City.

Formerly coordinating engineer with Jack & Heintz, Inc., Cleveland, **KENNETH A. HONROTH** has resigned this position to become associated with the Perfection Products Co., of which he is an active partner.

RALPH F. PEO, vice-president and a member of the Board of Directors of the Houdaille-Hershey Corp. and general manager of the corporation's subsidiary, the Houde Engineering Division announced his resignation effective Oct. 1. No statement can be made at the present time, Mr. Peo said, regarding his future plans.

Long prominent in the automobile industry, Mr. Peo during the war rolled up impressive production records in two plants. As general manager of the Houde Engineering Division plant, he converted and expanded the factory in record time for the production of hydraulic devices for airplanes and military vehicles. As vice-president and general manager of the Buffalo Arms Corp., he built a new plant on the outskirts of Buffalo, installed millions of dollars of machinery, assembled a "raw" organization of thousands of workers, and turned out tens of thousands of machine guns, exceeding the government's monthly quotas by impressive margins.

He joined Houde in 1927 when the company was beginning to produce automotive shock absorbers on a mass scale. He was made vice-president and general manager of the company in 1929. In 1935 he was elected to the board of directors of Houde's parent organization, the Houdaille-Hershey Corp. and to a vice-presidency of Houdaille-Hershey. During this period he also was vice-president and manager of another of the corporation's subsidiaries, the Heinze Electric Corp. He has been a member of the SAE for 20 years.

Ralph F. Peo

New Group at Bendix

Establishment of a sales and engineering group of Bendix Aviation Corp. was announced recently by Allan C. Chambers (upper right), director of automotive sales of Bendix Products Division. The program, functioning under the direction of Mr. Chambers and Bryan E. House (lower right), chief engineer of the division's automotive brake section, includes the development, manufacture and marketing of braking systems designed to meet the special needs of postwar tractors and other farm vehicles and construction machinery

Allan C. Chambers

Bryan E. House

RAY C. ELLIS has been appointed vice-president of the Raytheon Mfg. Co., Inc., Waltham, Mass. Mr. Ellis was formerly

Ray C. Ellis

director of the radio and radar division of the War Production Board. Before joining the WPB, he was general manager of the Delco Radio Division of General Motors Corp.

Formerly with a Navy V-12 Unit at the University of Minnesota, Minneapolis, Minn., **B. C. COFFIN,** an apprentice seaman in the USNR, is now stationed at the U. S. Naval Training Center at Great Lakes, Ill.

CHRISTOPHER J. FREY has been appointed research and development enginneer for Carney Engineering Co., New York City. He formerly held a similar position with Anderson Aircraft, Inc., same city.

ROBERT S. TREMBATH is now project engineer with Buick Motor Division, General Motors Corp., Flint, Mich. He was formerly experimental test foreman, Buick Aviation Division, General Motors Corp., Melrose Park, Ill.

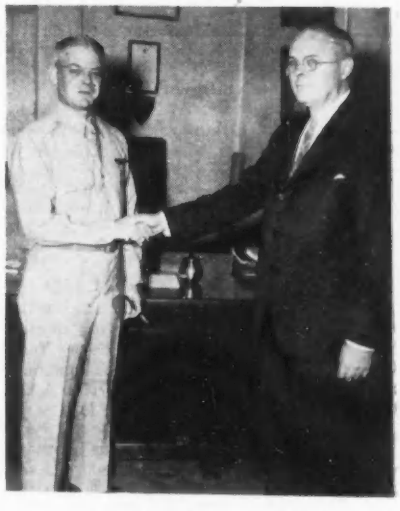
Formerly superintendent of maintenance, Cain's Truck Lines, Oklahoma City, Okla., **A. A. SUGGS** is now shop foreman with the Yellow Transit Co., same city.

DAVID CAMERON, Wright Aeronautical Corp., Paterson, N. J., has been promoted from assistant quality manager to quality manager.

LT.-COL. C. C. LAWTON, Quartermaster Corps, has been transferred to Headquarters, Army Service Forces Training Center, Camp Lee, Va., where he has been assigned as director of supply. Colonel Lawton was formerly director, Parts Standardization Project Field Headquarters, Quartermaster Corps, Chicago.

ROGER F. WINCHESTER has resigned from his position as project liaison engineer with Consolidated Vultee Aircraft Corp., San Diego, Calif. His plans for the winter include the development of some land he has purchased near Jamocha Airport.

KARL HOFFMANN is now chief draftsman at Specialties, Inc., Syosset, L. I., N. Y. He formerly held a similar position with the Stratos Corp., Babylon, L. I., N. Y.



Lyman C. Josephs, Jr., (right), chief engineer of Army Service Forces, Ordnance Research & Development Center, Aberdeen Proving Ground, Md., is shown with Col. G. G. Eddy, director of the Center. Mr. Josephs had been vice-president and chief engineer of Mack Mfg. Corp., New York City, before coming to APG

John D. Waugh

JOHN D. WAUGH, formerly technical editor, Propeller Division, Curtiss-Wright Corp., Caldwell, N. J., has joined the sales department of Aeromatic Aircraft Propellers, Koppers Co., Inc., Bartlett Hayward Division, Baltimore, Md. Mr. Waugh has just recently returned to this country from a two-month tour of Germany with a Government mission studying German aviation.

ORA G. BLOCHER is now design specialist in the Experimental Engineering Division of Bendix Aviation Corp., Detroit. He was formerly chief engineer at Stout Research Division, Consolidated Vultee Aircraft Corp., Dearborn, Mich.

Formerly assistant motor engineer, Cadillac Motor Car Division, General Motors Corp., Detroit, **WILLIAM M. DAWE** is now employed as service engineer with the Aluminum Co. of America, Detroit.

Formerly at the Naval Repair Base at San Diego, Calif., **FRED R. MUERDTER,** a chief motor machinist's mate in the U. S. Navy, may now be contacted c/o Fleet Post Office, San Francisco.

ALBERT E. BRENNEMAN is now an automotive engineer in fuels research at the Esso Laboratories, Standard Oil Development Co., Elizabeth, N. J. He had formerly been with the Standard Inspection Laboratory of the same company.

LEON E. GREELEY, U. S. Army, is now serving in the Philippines. He was formerly stationed at Ohio State University, Columbus, Ohio.

Formerly associated with R. Hoe & Co., Inc., New York City, **ARNOLD J. HALBFASS** is now design engineer with the Cameron Machine Co., Brooklyn, N. Y.

Formerly a junior cadet engineer with Carbide & Carbon Chemicals Corp., Oak Ridge, Tenn., **BERTRAM A. CHESLER** is now in the U. S. Navy.

MAJOR LAWRENCE W. HEM, USAAF, on leave from his civilian position as instructor in mechanical engineering at the School of Technology, CCNY, New York City, is now assistant chief of the materials and packaging branch, Headquarters AAF, Production Division, Washington, D. C.

WALTER S. BRADFIELD is now a junior engineer at the Johns-Hopkins Laboratory of Applied Physics, Silver Spring, Md. He was formerly graduate assistant at the Wind Tunnel Laboratory, C.I.T., Pasadena, Calif.

Formerly sales engineer with Lycoming Division of the Aviation Corp., Williamsport, Pa., **GEORGE J. TOTH** has been appointed automotive sales engineer of Socony-Vacuum Oil Co., Inc., in the Charlotte, N. C., district.

Formerly designer and draftsman at Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn., **CHARLES A. BARESCH** is now experimental test engineer with the same firm.

D. R. PEACOCK, formerly design engineer with Wright Aeronautical Corp., Paterson, N. J., now holds a similar position with Columbian Rope Co., Auburn, N. Y.

WILLIAM H. HASTINGS, a first lieutenant in the USAAF, was reported missing in action June, 1945. Lieutenant Hastings was first pilot on a C-47 and served in the China-Burma-India Theater of War.

SAE members who have received recent promotions within the Armed Forces include: **S. G. NORDLINGER,** Headquarters India-China Division – ATC, c/o Postmaster, New York City, and **KENNETH L. STEHLE,** AAF Air Depot, A.P.O. 953, c/o Postmaster, San Francisco, have been promoted from majors to lieutenant colonels; **THEODORE M. FAHNESTOCK,** Ordnance Department, Detroit, has been promoted from first lieutenant to captain; and **ROBERT C. HAMILTON,** Wright Field, Dayton, Ohio, has been promoted from second lieutenant to first lieutenant.

Formerly assistant to chief electrical draftsman, Chrysler Corp., Detroit, **H. CHARLES SIMONS** is now resident electrical engineer at the De Soto Division of Chrysler Corp., Detroit.

ARTHUR E. COX has been named assistant chief body engineer of Graham-Paige Motors Corp., Detroit. He was formerly supervisor of draftsmen, Murray Corp. of America, same city.

JOHN M. LOGAN has been appointed assistant sales manager of the Lord Mfg. Co., Erie, Pa. He was formerly Government contract supervisor in the Dynafocal Sales Department of the same company.

Formerly junior engineer with Bendix Aviation Corp., South Bend, Ind., **JACK R. SAYLOR** is now station attendant with United Air Lines, Inc., Chicago, Ill.

GERD H. GRIESHABER, Aircooled Motors Corp., Syracuse, N. Y., is now mechanical draftsman in the engineering department. He was formerly tooling engineer with the same firm.

E. C. WALTON-BALL has been named engineering sales manager of Amalgamated Enterprises, Toronto, Ont., Canada. He was formerly assistant engineer with Titeflex, Ltd., same city.

CAPT. KNUTE M. GULOWSEN has returned to his civilian position with the New York City Vocational High School System. He was formerly director of the Wheel Vehicle Course at Fort Crook, Nebr.

Capt. Knute M. Gulowsen

N. F. Adamson

N. F. ADAMSON has been elected vice-president in charge of sales and engineering of the Twin Disc Clutch Co., Racine, Wis. He has been general sales manager for the past two years, and has been associated with the Twin Disc Clutch Co. for more than two decades. He was chief engineer for many years, and prior to that time worked with the sales and engineering departments. Announcement of the appointment of **E. C. BILLINGS** as sales manager of the Racine, Wis., division, and of **ROGER G. DeLONG** as sales manager of the Hydraulic Division at Rockford, Ill., was made at the same time.

Formerly at Camp Crowder, Mo., **EDWARD ZWERDLING,** a private in the U. S. Army, is now a hospital inspector at Fort Riley, Kans.

W. S. BERRY is now with the Engineering Research Division of Nash-Kelvinator Corp., Detroit, Mich. He was formerly chief test engineer in the Aircraft Engine Division of the same company in Kenosha, Wis.

Formerly at the Naval Dry Dock at South Boston, Mass., **WAYNE H. BROWN,** a lieutenant (jg) in the USNR, is now in the Planning Division, Navy Yard, c/o Fleet Post Office, San Francisco.

E. J. NESBITT is now sales engineer with Sikorsky Aircraft, Division of United Aircraft Corp., Bridgeport, Conn. He was formerly Sikorsky representative, Nash-Kelvinator Corp., Detroit.

HOWARD D. INGALLS is now superintendent of engineering and maintenance with Bluegrass Airlines, Bowling Green, Ky. He was formerly vice-president in charge of engineering and maintenance for Northeast Airlines, Inc., East Boston, Mass.

JOHN MANDERSON EVANS is now associated with the Griffin Chemical Co., San Francisco. He was formerly assistant sales manager of Tide Water Associated Oil Co., same city.

DONALD R. LOCKWOOD, a warrant officer in the U. S. Army, has been transferred from Camp Swift, Tex., and may now be contacted c/o Postmaster, San Francisco.

E. T. WALTON is now assistant to the vice-president of Pittsburgh Crucible Division of the Crucible Steel Co. of America, Pittsburgh, Pa. He was formerly associate director of metallurgy, Crescent Laboratory, same company.

GRACE MUSKER, formerly a student member at the University of Manitoba, Winnipeg, Man., Canada, has been named mathematical computer and assistant to the manager of experimental manufacturing of the Stratos Corp., Babylon, L. I., N. Y.

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Check List of SAE Meetings Papers

Here are listed those papers presented before National and Section Meetings of the Society of Automotive Engineers, which are still available in mimeographed form.

The SAE policy, in respect to mimeographed copies of these papers, is to make them available for at least one year after presentation.

The following papers, divided under four general headings for your convenience, are available at 25 cents to SAE Members and 50 cents to Non-Members. Quantity lots of more than 10 papers by any one author may be had at reduced rates. Ten or more mimeographed papers of any one title are available at reduced rates from the Special Publications Department, Society of Automotive Engineers, 29 West 39 Street, New York 18, N. Y.

NEW Papers This Month

Check Here	Author	Title of Preprint of Paper	Date of Presentation
	Bentz, E. J. H.	Helicopter Design Problems	Nov. 1, 45
	Berry, B. M. Rollins, F. S.	Aviation Lubricating Oils	Aug. 24, 45
	Brandes, Dr. O. L. Donaldson, H. H. Jr.	Use & Evaluation of Heavy Duty Engine Oils	May 9, 45
	Cattaneo, A. G. Bollo, F. G. Starly, A. L.	A Petroleum Research Engineer's Outlook on Fuels for Conventionally Powered & Gas Turbine Aircraft	Aug. 24, 45
	Frye, Col. J. H.	Metallurgy of Foreign Automotive Materiel	Jan. 8-12, 45
	Kelley, Bartram	Helicopter Stability with Young's Lifting Rotor	March 19, 45
	Landgraf F.	Helicopter Design Problems	Nov. 1, 45
	Lingle, Col. D. G. Seitz, Capt. G. A.	Army-Navy Aeronautical Standardization	Reprinted – Nov. 42 SAE Journal
	Loweke, E. F.	Power Brake Valves	Nov. 1, 45
	McBrearty, J. F.	Utilization of New High Strength Aluminum Alloys	Oct. 4, 45
	Miller, Roy A. Tatman, Max E.	Shop Aspects of the New High Strength Aluminum Alloys	Oct 4, 45
	Moreton, D. H.	Problems Involved in Airframe Lubrication	Aug. 24, 45
	Oetzel, J. G.	Post War Brakes	May 10, 45
	Park, Bryan	Over the Road Diesel Operation	May 15, 45
	Rodriguez, D. L.	Wartime Aircraft Service Problems — Their Solution	June 19, 45
	Rowe, M. R. Ladd, G. T.	Water Injection for Aircraft Engines	Aug. 24, 45
	Schweitzer, P. H. Sharples, L. P.	S-S System of Lubrication for Aircraft Engines	Oct. 4, 45
	Siemmons, C. O.	Rubber Tracks for Agriculture	Sept. 13, 45
	Taylor, C. Fayette	Effect of Engine Exhaust Pressure on the Performance of Compressor Turbine Units	Oct. 4, 45
	Twymar, L. R.	Hydraulics as Applied to Tractors & Farm Machinery	Sept. 13, 45
	Vaughn, F. F.	Induction Hardening as Applied to Farm Machinery	Sept. 13, 45
	Weeks, W. L.	Factors in Aeration & Deaeration of Aircraft Engine Oil	Oct. 4, 45
	Wendell, E. E. Warden, H. H. Kerr, H. H.	Weight Reduction of Aircraft Braking System thru the Use of Reverse Thrust Propellers	Oct. 4, 45

Papers Previously Announced

Vehicles

	Austen, Robert N.	Maintenance Engineering of Chassis Leaf Springs	May 9, 45
	Boebinger, Maj. E. J.	Testing of Automotive Equipment at Aberdeen Proving Ground	Oct. 11, 44
	Burke, John D.	The Practical Postwar Car — Report of Automobile Body Survey Conducted by the San Francisco Examiner	Jan. 8-12, 45
	Burkhalter, R. R.	Truck & Bus Transmissions	Oct. 10, 44
	Churchill, H. E.	The Weasel	March 19, 45
	Colby, Col. J. M.	Contributions of Industry to Ordnance Tank-Automotive Engineering	Jan. 8-12, 45
	Collins, Tom J.	Post-War Diesel Engines	Feb. 12, 45
	Colwell, A. T.	Alcohol-Water Injection	Jan. 8-12, 45
	Colwell, A. T.	Fuel Requirements for Farm Tractors	Sept. 13, 44
	Davis, Francis W.	Power Steering for Automotive Vehicles	Jan. 8-12, 45
	Fageol, L. J.	Possibilities & Limitations of Post War Bus Design for City Transportation	Dec. 14, 44
	Fageol, F. R.	Advantages of Multi-Power Plants in Motor Buses	Jan. 8-12, 45
	Ford, Lee H.	Recent Developments in One-Man-Operated Farm Machines	Feb. 1, 45
	Gohn, E. P.	Post War Truck Selection & Conditioning	Feb. 12, 45
	Gohn E. P.	Cold Starting & Fleet Operation	Jan. 8-12, 45
	Hebert, Gordon	The Practical Postwar Car — Report of Automobile Body Survey	Jan. 8-12, 45
	Herold, Richard	Supercharged Two-Stroke Cycle Diesels	Nov. 9, 44
	Horine, Merrill C.	Engineering Features of an Off Highway Truck	Jan. 19, 45
	Hunt, J. H.	The Future of SAE Automobile Standards	Jan. 8-12, 45
	Jackman, George	Truck Refrigeration	Nov. 10, 44
	Kettering, C. F.	Fuels and Engines for Higher Power and Greater Efficiency	Jan. 8-12, 45
	Kishline, F. F.	Probable Post-War Automobile Design Trends	Dec. 1, 44
	Lautzenhiser, F. B.	A Non-Technical Discussion of Diesel vs. Gasoline Power Plants in Motor Trucks	Jan. 8, 45
	Liggett, John T.	Air Cleaners on Crawler Tractors	Oct. 10, 44
	Peirce, T. H.	Bonded Rubber Torsional Vibration Dampers for Diesel Engines	Jan. 8-12, 45
	Pierce, Bert	The Practical Postwar Car	Jan. 8-12, 45
	Rendel, T. B.	Post War Internal Combustion Engines and Their Fuels	Dec. 14, 44
	Taussig, W. A.	Bus & Truck Power Plant Periodic Maintenance	Sept. 21, 44
	Vincent, E. T.	Piston Development Review	Jan. 8-12, 45
	Werner, R. M.	Possibilities of Multiple Power Plants in Motor Trucks	Jan. 8-12, 45
	Wilson, H. D.	Report of Automobile Body Survey conducted by the Chicago Herald American	Jan. 8-12, 45

Aeronautics

	Anderson, R. L.	Effect of Airplane Design on Maintenance	Nov. 17, 44
	Ayres, Arthur	Airports as Affected by Aircraft Performance & Weight	Jan. 8-12, 45
	Bachle, C. F.	Some Possibilities of Turbine Compounding with the Piston Engine	Jan. 8-12, 45
	Beal, G. F.	Making the Cockpit Practical	Jan. 8-12, 45
	Beard, M. G.	Future Operational Requirements in Relation to Cockpit Design	Oct. 5-7, 44
	Bergen, Com. J. J.	Some Observations on the Financing of Local Air Transport	Jan. 8-12, 45
	Brewster, J. H.	Fundamentals of Flight Induced and Forged Cooling	Oct. 5-7, 44
	Brown, Merle Hoffman, Luther Griffin, J. R., Jr.	Cockpit Lighting	Nov. 17, 44
	Brown, R. W.	Research & Tomorrow's Aircraft Undercarriage	Oct. 5-7, 44
	Burton, E. F. Wood, Carlos	The Design of the DC-4/C-54	Oct. 5-7, 44
	Campbell, Kenneth	Some Advantages and Limitations of Centrifugal & Axial Aircraft Compressors	May 7, 45
	Campbell, Kenneth	Engine Cooling Fan Theory & Practice	April 5-7, 44
	Carroll, W. F.	Airports in Southern California	Jan. 11, 45
	Chase, Capt. J. H.	Analytical Fuel Reserve Systems for Long Range Aircraft	Oct. 5-7, 44
	Clyne, James W.	Converting Military Aircraft for Commercial Use	Nov. 16, 44
	Colin, Lt. R. J., Jr.	Electronic Controls in Aircraft	Jan. 8-12, 45
	Costa, Philip J.	Detonation in Flight — Its Effect on Fuel Consumption & Engine Life	Jan. 8-12, 45
	Cunningham, J. W.	High Conductivity Cooling Fins for Aircraft Engines	May 1, 45
	Dietrich, F. J.	Aircraft Riveting & Equipment	May 1, 45
	Dircksen, Maj. A. D.	Aircraft Lighting	Jan. 8-12, 45

Aeronautics Continued

Check Here	Author	Title of Preprint of Paper	Date of Presentation
_____	Dolza, John	Coordination of Fluid Coupling Driven Auxiliary Supercharger Speed to Engine Manifold Pressure	Jan. 8-12, 45
_____	Edwards, M. L.	Performance of the Air Oil Separator in Engine Breather Systems	April 24, 45
_____	Etchells, E. B. Underwood, A. F.	Silver Bearings	May 7, 45
_____	Field, Howard	Reduction of Vulnerability of Aircraft Hydraulic Systems	April 19, 45
_____	Floyd, Thomas N.	Aircraft Environment, Thermal Effects	Oct. 5-7, 44
_____	Foley, E. J.	Planning for Post War Air Transportation	Oct. 10, 44
_____	Foster, J. N.	Application of High Production Methods to Reduced Production	Oct. 5-7, 44
_____	Fraas, Arthur P.	Flow Characteristics of Induction Systems	Jan. 8-12, 45
_____	Friedlander, J. W.	Operating Costs of Personal Airplanes	May 7, 45
_____	Gardiner, Duncan B.	Electronic Analysis of Airplane Hydraulic Braking Systems	Jan. 8-12, 45
_____	Gates, Hon. A. L.	Naval Aviation Today in the Pacific	Feb. 5, 45
_____	Gordon, Kenneth	Control Cabin Development	Jan. 8-12, 45
_____	Gray, H. C. Jenny R. W.	Chafing on Aircraft Engine Parts	April 5-7, 44
_____	Gregg, David	Cabin Superchargers	Oct. 5-7, 44
_____	Harris, Col. H. R.	History & Development of the Air Transport Command	Sept. 14, 44
_____	Herrmann, K. L.	New Light Weight Power Plants for Post War Airplanes	Nov. 9, 44
_____	Hicks, R. D.	Service Experience with Light Aircraft Engines	May 7, 45
_____	Houghton, Maj. R. M.	Development of Plastic Materials for Aircraft Construction	Oct. 5-7, 44
_____	Johnson, Ralph S.	Coordination of Flight Deck Duties on Large Airplanes	Oct. 5-7, 44
_____	Kelly, R. D.	A Means of Warning of Incipient Breakdown of Smooth Air Flow of Airfoil Surfaces	Oct. 5-7, 44
_____	Kendrick, J. B.	Applied Aero-Economics	Jan. 8-12, 45
_____	King, W. J.	Axial Versus Centrifugal Superchargers For Aircraft Engines	May 7, 45
_____	Klein, Dr. A. L.	Fundamentals of Airplane Design	April 5-7, 44
_____	Knight, William	Stresses in Disc Wheels	April 5-7, 44
_____	Loomis, R. C.	Cruising Control of Transport Aircraft	Oct. 5-7, 44
_____	Loudenslager, O. W.	Structural Model Testing	May 1, 45
_____	Lusk, Capt. R. J.	Protection of Electrical Systems on Military Aircraft	April 24, 45
_____	McCarthy, C. J.	Aircraft Manufacturing and Air Transport	Nov. 16, 44
_____	McFarland, F. R.	Aircraft Engine Gears	May 7, 45
_____	MacNeil, C. S.	Propellers and Air Transport	Nov. 17, 44
_____	Magruder, P. M.	Future Trends in Intercontinental Transport Aircraft	Jan. 4, 45
_____	Maloy, Raymond B.	A Resume of Desirable Characteristics for Non-Stalling, Non-Spinning Airplanes	May 7, 45
_____	Mentzer, W. C. Mitchell, E. C. Michael, M. L. Silber, S. R.	Cargo Tiedown and Stowage	Dec. 4-8, 44
_____		High Altitude Factors in Flight Testing	Oct. 5-7, 44
_____	Mitchell, Col. C. H.	Development of Military Aircraft During Wartime	Dec. 15, 44
_____	Moon, C. L.	Mechanized Handling of Airplane Cargos	Dec. 4-7, 44
_____	Mullen, H. A. Boelter, L.	Aircraft Spotwelding at Willow Run	May 1, 45
_____	Nutt, Arthur	The Future of Standardization in the Aeronautical Industry	Jan. 8-12, 45
_____	Parks, M. J.	Cargo Airplane Accessories	Dec. 4-8, 44
_____	Parvin, D. R.	What About the Age of Flight? Air Transportation in the 5 years to follow the war.	Jan. 8, 45
_____	Piry, Marcel	Single Cylinder Engine High Altitude Cooling Tests	May 1, 45
_____	Prewitt, R. H.	Basic Factors of Helicopter Design	Jan. 8-12, 45
_____	Rawdon, Herb	Wood Versus Metal Aircraft Construction	Oct. 28, 44
_____	Rawdon, Herb	Requirements of the Feeder Line Airplane	Dec. 4-8, 44
_____	Rea, James B.	The Operation of Consairway by Convair has Influenced Post War Aircraft Design	Nov. 16, 44
_____	Reichel, W. A.	War Lessons in Testing of Accessories & Instruments	Oct. 5-7, 44
_____	Richards, W. M. S.	The Prediction of Engine Cooling Requirements by a Graphical Method	Oct. 5-7, 44
_____	Robinson, Ray	The Postwar Market for Personal Planes	May 7, 45
_____	Rose, B. A.	Humidity Effects on Airplane Equipment Performance	Oct. 5-7, 44
_____	Rudd, J. K. Heath, Westcott	Radio Interference and the Aircraft Engine	Oct. 5-7, 44
_____	Schirtzinger, J. F.	The Development of Spar Caps with Integral Fittings	Oct. 5-7, 44
_____	Schleicher, R. L.	A Current Outlook on the Effects of Dynamic Loads on Aircraft	Oct. 5-7, 44
_____	Sheets, J. H. MacKinney, G. W.	Reverse Thrust Propellers for Use as Landing Brakes for Large Aircraft	Oct. 5-7, 44
_____	Shue, G. S.	Compressibility	Sept. 19, 44
_____	Smith, G. G.	Crewless Craft	Dec. 4, 44
_____	Smith, Robert L.	Potentialities of Air Cargo as a Merchandising Aid	Jan. 11, 45
_____	Stafford, Paul H.	Trends in Airport Runway Design	Jan. 8-12, 45
_____	Streett, John W.	The Detection of Detonation & other Operating Abnormalities in Aircraft Engines by Means of Special Instrumentation	Jan. 8-12, 45
_____	Tsongas, A. G. Macomber, F. S.	Cost Planning the Postwar Small Airplane	Oct. 5-7, 44
_____	Wache, Miller A.	Building Utility into the Helicopter	Feb. 7, 45
_____	Warner, Edward	International Airworthiness Standards	Jan. 8-12, 45
_____	Weick, Fred	Four Years of Simpler Flying with Ercoupes	Oct. 5-7, 44
_____	Wheeler, W. L.	Oil System Problems at High Altitude	Oct. 5-7, 44
_____	Williams, G. L. Miller, A. B.	Primary Balancing of Radial Engines	Jan. 8-12, 45
_____	Wolfe, Thomas	Shipping by Air	Dec. 4-8, 44
_____	Wood, Carlos Croshere, A.B.	A Proposal for the Establishment of Commercial Air Cargo Service	Dec. 4-8, 44
_____	Wooton, J. A.	Manufactured Gooda, Including Merchandise	Dec. 4-8, 44

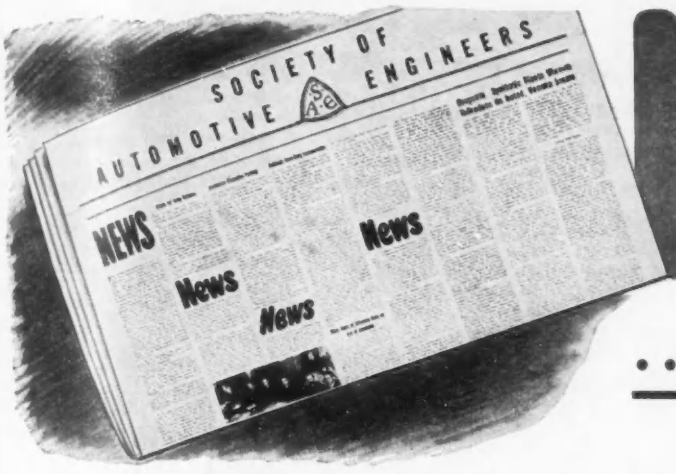
Fuels and Lubricants

_____	Ambrose, H. A. Trautman, C. E.	Engine Oil Foaming	Jan. 8-12, 45
_____	Becker, C. F.	Gasolines — Past, Present, Future	Dec. 1, 44
_____	Brabbs, Lt. A. D.	Testing Heavy-Duty Lubricating Oils for Naval Service	Nov. 9-10, 44
_____	Britton, Maj. S. C. Schlesinger, W.	Military Aircraft Grease Lubrication	Nov. 9-10, 44
_____	Effmann, Karl H.	Engine Oil Consumption Determination	March 8, 45
_____	Galindo, Lt. Com. H. L.	Navy Experience With Diesel Fuels & Lubricants	May 17, 45
_____	Georgi, Carl W.	Detergency or Dispersancy in Heavy Duty Engine Oils	Nov. 9-10, 44
_____	Holaday, W. M. Mount, W. S.	Discussing the Fuels and Lubricants Supply Problem	May 15, 45
_____	Keyser, Paul V.	Progress Report on Gear Oils Projects-CRC	Jan. 8-12, 45
_____	Penfold, Norman C.	Some Comments on Engine Testing of Heavy-Duty Oils	Nov. 9-10, 44
_____	Pigott, R. J. S.	Considerations Affecting Fuels & Lubricants from the War Work	Jan. 16, 45
_____	Ronan, J. T.	Motor Oil Performance	Dec. 11, 44
_____	Savard, A. J.	Fuel Vapor Recovery	Feb. 20, 45
_____	Wright, W. A.	A Survey of Past & Present Trends in Lubricating Oil Additives	Nov. 9-10, 44

Miscellaneous

_____	Aufmuth, R. B.	The Practice of Power Metallurgy	March 12, 45
_____	Erwin, Wesley S.	The Sonigage, A Supersonic Contact Instrument for Thickness Measurement	Oct. 5-7, 44
_____	Foster, J. N.	Application of High Production Methods to Reduced Production	Oct. 5-7, 44
_____	Jackson, P. B.	Aluminum After the War	March 14, 45
_____	Osborn, H. B. Jr.	Tocco Hardening	Jan. 8-12, 45
_____	Painter, Richard Huber, Paul	Technique for Practical High Speed Motion Pictures	Jan. 8-12, 45
_____	Porter, F. P.	Methods for Calculating Torsional Vibration	Jan. 8-12, 45
_____	Sanders, Morris	Wartime Fabric Developments of Significance to the Automotive Industry	Jan. 8-12, 45
_____	Somes, Howard E.	Induction Heat Treatment of Internal Surfaces as Applied to Automotive Industries	Jan. 8-12, 45
_____	Strothman, E. P.	Some Cases for Steel as a Material	Jan. 8-12, 45
_____	Swoboda, L. F.	Advantages & Characteristics of Light Metal, Permanent Mold Castings	Oct. 5-7, 44
_____	Riesing, E. F.	Synthetic Rubber Mechanical Parts in Present and Post-war Vehicles	Jan. 8-12, 45

Limited supply of older SAE Meetings Papers in mimeographed form is also available. A permanent file of SAE Meetings Papers is kept in the SAE Library, from which photostatic copies can be made, upon request, at cost.



News..

..OF THE SOCIETY

SAE Iron and Steel Experts Consider Long-Range Projects

DETAILED discussion of numerous metallurgical subjects, looking toward a broad-range program for continuing SAE work in those areas, took place at the SAE War Engineering Board's Iron & Steel Committee, Sept. 17, in Detroit.

Among the topics and questions reviewed were:

Consideration of a request from the Army Ordnance Department for a peacetime advisory program. Army representatives pointed out that the Department was eager to be kept in close touch with ferrous metallurgical developments by industry.

Appropriations have been allocated to Ordnance for research, an Army representative stated, and indicated the Army's interest in SAE suggestions regarding what can and should be done. While suggesting no definite program in response to the officer's comments, the committee urged the importance of continued liaison between Ordnance and industry in metallurgical areas so that industrial developments might be constantly available for military purposes.

Improvement in the ferrous alloy section of the SAE Handbook was discussed, with view of bringing detailed suggestions to the attention of the new SAE Technical Board.

Continuation of the study of hardenability of steels as a basis of specifying steels instead of relying on the older method of specifications based upon chemical compositions was discussed.

In detail, the Iron & Steel Committee believes that the hardenability bands can be narrowed materially. Only by pooling test and service data on parts can this be achieved, experience has showed. Considerable additional experience, currently being obtained by steel mills and automotive vehicle and parts manufacturers, must be pooled to refine these bands, and user representatives agreed at the meeting.

As the present hardenability bands are narrowed, their use will increase, it was pointed out. Conversely, the more these bands are used to specify steels, the greater will be the experience which will result in further narrowing the bands, it was believed.

Bright spot in the outlook, it was reported to the group, was the increasing number of manufacturers making tests of hardenability bands as the basis for steel specifications – even in the early stages of design of parts and equipment.

Test Work Progress

Progress was reported to the committee by A. L. Boegehold, General Motors Corp., on the test work involved in an investigation on "as quenched" hardness of steels. A series of fatigue tests is being carried on by the Ford Motor Co., he said, through the cooperation of F. A. Young of Ford, a member of the Committee. The Committee agreed that this was a worthwhile contribution in the development of hardenability as an improved method for the specifications of steels.

Another progress report on a research program, and one which requires a coordination of the producers and users of steels, was reported to the committee in a discussion participated in by H. W. Knowlton, International Harvester Co.; A. L. Boegehold, General Motors Corp., and R. B. Schenck, Buick Motor Division, GMC. This is an investigation of the physicals of cold drawn steels and is a study resulting from a request of the Ordnance Department.

The group undertaking the investigation pointed out that the Government is interested in knowing:

a. "What can cold drawn steels of certain physicals be used for?" and

b. "Can these steels be substituted for certain other steels?"

No one, it is reported, has the answers.

It was disclosed by Mr. Knowlton that the manufacturers of cold drawn steel might be willing to set up specifications for cold drawn products. The challenge to the committee, posed by the Ordnance Department, is for a study of all the physical properties of cold drawn steels as compared with heat treated steels having approximately the same hardness and yield strength.

Again, it was reported that best results could be obtained from the efforts of a joint committee of the producers of steel, as represented by the AISI, and the users, as represented by the SAE.

Because of the pioneering nature of the study proposed, Chairman R. W. Roush, Timken-Detroit Axle Co., named Messrs. Knowlton, Boegehold, and Young to work out details of this study with Major H. W. Oshry, Ordnance Department, as consultant.

This work is in line with the official request of Lt.-Gen. Levin H. Campbell, Jr., Chief of Ordnance, ASF, that the SAE continue its role as a part of what he has hailed as the "Ordnance-Industry Team" to carry on through the peace years the continuation of coordinated technical advisory work which helped to win the war.

Members of the SAE War Engineering Board's Iron & Steel Committee, serving under the chairmanship of Mr. Roush, are Mr. Boegehold; Hymann Bornstein, Deere & Co.; W. P. Eddy, Jr., Pratt & Whitney Aircraft Division, United Aircraft Corp.; William H. Graves, Packard Motor Car Co.; Mr. Knowlton; E. O. Mann, Chevrolet Motor Division, GMC; F. E. McCleary, Chrysler Corp.; G. C. Riegel, Caterpillar Tractor Co.; Mr. Schenck; E. H. Stilwill, Chrysler Corp., and Mr. Young. Consultant is Major Oshry. Col. J. H. Frye, who recently returned to civilian life as metallurgist for the Columbia Steel & Shafting Co. and associated companies, was the prime consultant of the committee since its organization.

Basis of Agreement Reached at Ottawa

PROGRESS toward unification of American, United Kingdom and Canadian engineering standards was reported at the conclusion of a fortnight of detailed discussions on basic problems. This was the third of a series of international conferences seeking to resolve variant engineering design practices into a single series of A-B-C (American, British, Canadian) standards.

Differences between the British and American screw thread forms, for example, caused untold delay and excessive expenditures in the combined war production program of the three nations, according to the Combined Production & Resources Board, sponsor of the unification program.

Salient problem facing the delegates, therefore, was reaching a basis of agreement on this subject. The British practice has been to use a 55 deg screw thread form, and the U. S. standards are based on a

SAE VETERANS AVAILABLE

Following are briefed experience records of SAE veterans of World War II who are seeking employment through the SAE Placement Service. Interested employers are invited to address inquiries by number to SAE Placement Service, Society of Automotive Engineers, 29 West 39 St., New York 18, N. Y.

5037 Automotive Engineer, 52, honorably discharged U. S. AAF Jan. 1, 1945, after serving overseas as Major and Lt. Colonel, experience in research, lubrication, as mgr. of sales petroleum co., super-service stations; can handle fleet operation, take complete charge of shops and can handle men. Available immediately. Resident – Chicago, location open.

5039 Prod. Engr., 37, experienced in aircraft engine maint., working for Army Air Depot, discharged soldier World War II, 10 points preference with Civil Service Comm., foreign languages French and German, available now. Resident – Utah, location preferred – East or Europe.

5096 Transp. Engr. and Supt. of Automotive Maint., 56, experienced heavy duty equipment both diesel and gasoline powered, has had wide experience in field inspections, also setting up and teaching in automotive schools. Speaks French and German. Will consider foreign service. Army service. Has had charge of large shops, maint. of all types of motor cars and trucks for manufacturer, dealer and fleet owner. Resident – N. Y. C., available immediately.

5099 Mechanical Engineer, 27, experienced in aircraft engine and spark plug testing and general aircraft inspection. Now in Army, desires maint. engrg. position with an airline. Will accept U. S. or foreign location. Resident – Pa.

5102 Young Grad. Aer.. Engr., 26, with 3 yrs. experience, desires engrg. position involving coordination of design, tooling and prod. depts. Discharged veteran AAF. Willing to undertake advanced schooling in preparation for possible future executive position in organization. Has completed one yr. grad. work in business adm. Resident – Ohio, prefers New England or Midwest location.

5127 Fleet Operation, Maint. and Service Supt., 48, wide experience in truck transportation, also heavy equipment such as road equipment and cranes. Recently discharged U. S. Navy "Seabees" after 2 yrs. in South Pacific Islands. Resident – Calif., location open.

5132 Grad. Aero. Engr., 30, experience in aircraft engine installation, prod. engine testing, engine experimental engrg. and wind tunnel testing. Desires position in prod. engrg. with opportunities in prod. management. Resident – Penn., location open.

5133 Aero. Engr., 45, married, dependent, lawyer, admitted legal practice 12 yrs., grad. Naval engineer, 8 yrs. experience mostly aeronautical; BS, LL.B. Naval Eng. JSDr.; supervisory experience in research, design, electric, physical and hydraulic testing, magnetos, highly precision equipments. Quality control organizer. Desires position with airline and/or where legal and engrg. knowledge and experience both useful. Was released USAAF Sept. 30, 1945, also served in World War No. 1 as test pilot (flying boats). Resident – N. Y. C., prefers N. Y. or foreign location.

5134 Aero. Engineer, 31, 8½ yrs. experience in airline, aircraft engine co., aircraft co. and Army Air Forces, desires permanent connection in aeronautical industry or engrg. sales. Resident – Calif., location open, foreign considered.

5157 Service Mgr. or Sales Service Engr., 39, 12 yrs. experience for mfr. of industrial engines (gas diesel) automobiles, trucks, marine engines, tractors, road building equipment or allied automotive equipment. Resident – Detroit, prefers Midwest location.

5165 Naval Officer, 40, ME and MME degrees, available soon, 20 yrs. experience gasoline and diesel engine development, research, motor coach fleet operation, executive ability, lab. direction. Resident – L. I., prefers L. I. or Met. N. Y. location.

5174 Grad. Mech. Engr., 23, honorable discharge U. S. A., 16 mos. experience designing precision instruments, electro-mechanical devices. Capable of assuming responsibility. Resident – N. Y. C., prefers N. Y. C. location or vicinity.

5186 Navy Test Pilot, 29, 8 yrs. aero. design and flying experience. ME degree. Desires sales engrg., contact, dev. or test work. Will travel anywhere. Available immediately. Resident – Penn.

5188 Supt., Fleet Operations and Maint., 28, 5 yrs. experience Army Operations and Maint. officer (475 vehicles), gasoline and diesel equipment. BS in ME. Resident – c/o Postmaster, San Francisco, Calif., prefers West or Northwest location. Available Jan. 1, 1946.

5192 Research & Dev. Engr., 35, MSE, 10 yrs. experience in all phases of lab. research and dev. Work with fuels and heavy duty lubricants in automotive, diesel and multi-cylinder aircraft engines; field testing and application of petroleum products to all type vehicles, and exper. testing and dev. of engine component parts. Considerable experience in supv., project planning, data analysis, specification writing and reporting. Army service as Captain – supervised service and lab. testing of petroleum products in all types of Army vehicles, prepared technical reports and recommendations. Also field petroleum inspection supv. Desires permanent responsible position with an engine, turbine or oil co. Resident – Mich., stationed in Wash., D. C., location open.

60 deg included angle. Specifications were written for a basic thread form that would, it is believed by the Ottawa conference spokesmen, provide a uniform standard by all nations using the inch system. Best features of each have been retained, so that the proposed change would involve the minimum departure from present engineering practices.

Progress was also reported on Acme and Stub-Acme threads, widely used in the aircraft industry and among machine tool builders.

Of interest to the automotive industry was progress toward reaching agreement on small screw standardization, in the field of watch, clock, and instrument manufacturers.

Other subjects on the agenda were reported to have progressed during the conference, although they were less conclusive. Among them were:

Drafting room practice; buttress threads; pipe threads; limits and fits; precision measurement practices, and special thread forms.

Leaders in the conference were Elmer J. Bryant, Greenfield Tap & Die Co., who headed the U. S. delegation; Stanley J. Harley, British Machine Tool Controller, who was the chief of the British group of 15 engineers, and James G. Morrow, Steel Co. of Canada, head of the Canadian group.

R. S. Burnett and E. W. Rentz, Jr., SAE staff representatives, served as members of the secretariat which worked with the various conference sessions and technical subcommittees during the conference.

SAE-RMA Radio Interference Study Sent to Manufacturers

RESULTS of a two-year study on motor vehicle interference with FM and television radio have been transmitted to the Automobile Manufacturers Association for information of its members by the SAE Technical Board. Summarizing findings by a joint committee of the SAE Vehicle Radio Interference Subdivision and the Radio Manufacturers Association, the report suggests means to eliminate short wave interference to radio sets emitted by the electrical equipment of automobiles, trucks, and tractors.

Actual standards are neither set up nor suggested by the joint committee, but the group does indicate "tolerable values which, if met in future production, would probably eliminate the needs for standards in the United States – such as those already set up by Canada.

The joint SAE-RMA committee makes these two main recommendations in this report:

1. Tentative value of "tolerable radiation," as approved at Rye, N. Y., should continue to be looked upon as a tentative value. This value is 35 mv per m at 50 ft between the automobile and the transmitting antenna, and is measured with a horizontal dipole antenna 7½ ft high, using the Measurements Corp. Model 58 Radio Noise Meter, or equivalent, and

2. That this tentative limit be called to the attention of the motor vehicle manufacturers through the AMA.

Data developed by the committee show that any vehicle powered by either a 4- or 6-cyl vertical engine can be suppressed to come within the tentative tolerable limits by the following provisions:

a. Use of a 10,000 ohm suppressor at each spark plug and the same size of sup-

pressor in the distributor-to-coil high tension lead;

b. Locating the high tension coil so that the high tension lead from the coil to distributor shall not exceed 8 in. in length, and

c. Keeping primary electrical wiring, metal rods, and conducting tubing as far from the high tension wire as possible.

In case of 8-cyl in-line engines, the above would suppress or come close to suppressing interference. Adding a condenser to the battery terminal of the ignition coil further suppresses radio noise.

Further work must be done on 8-cyl "V" type of engines, the joint committee believes. On the one model worked on by the committee, it was found impractical to locate the coil close enough to the distributor and still keep the high tension lead to 8 in.

The joint committee embarked upon this project in view of the probable wide extension of television, FM (frequency modulated), and shortwave AM (amplitude modulated) radio sets as soon as manufacturing restrictions are removed. Prewar experience was limited.

The surveys, studies, and tests were undertaken to guide vehicle manufacturers prior to general resumption of car, truck, and tractor production. Older vehicles can be supplied with suppressing equipment which would greatly reduce, if not entirely eliminate, troublesome interferences.

The first meeting of the group was held in February, 1944, in New York. The program was laid out, and subcommittees went into action.

During the week of June 11, 1944, the Vehicle Radio Interference Subcommittee, as associates, made a series of tests on seven automobiles at the Delco-Remy Radio Interference Laboratory at Anderson, Ind. During that summer the Receiver Subcommittee collected data on electrical interference susceptibility on several makes of television and FM receivers, approaching the problem with laboratory methods.

Committees Meet at Rye

Then in November the joint committee and the various subcommittees met at Rye, when the National Broadcasting Co. and the Columbia Broadcasting System put on controlled television broadcasts from New York. These were picked up by several makes of receivers. These broadcasts were controlled at the minimum strength at which commercially good receivers would give satisfactory reception, i.e., the so-called Fringe Area Signal or 50 mv per m for FM and 500 mv for television.

It was in these tests, in which a number of makes of receivers, installed in different cars, which determined the distance from the antenna to the car brought interference to the low, tolerable level.

Committee Members

The RMA-SAE Committee on Vehicle Radio Interference, under the chairmanship of K. A. Chittick, Radio Corp. of America, is composed of K. W. Brooks, P. R. Mallory Co., Inc.; W. S. Broughton, General Electric Co.; J. E. Brown, Zenith Radio Corp.; J. I. Cornell, Solar Mfg. Co.; R. M. Critchfield, Delco-Remy Division, GMC; F. A. Gunther, Radio Engineering Laboratories; D. D. Israel, Emerson Radio & Phonograph Co.; P. J. Kent, Chrysler Corp.; R. H. Manson, Stromberg Carlson Co.; H. O. Merriman, Radio Division, Canadian Department of Transportation; W. G. Schneider, Electric Auto-Lite Co.; J. Minter, Measurements Corp.; D. Mitchell, Galvin Mfg. Co.; P. Robinson, Sprague Specialties Co.; R. D. Scheldorf and H. J. Schrader, RCA Victor Division, RCA; B. A. Schwarts, Delco Radio Division, GMC, and H. J. Tyzzer, Ferris Instrument Co.

Members of SAE Subdivision VIII, Vehicle Radio Interference, is made up of Chairman Kent; L. L. Beltz, Packard Motor Car Co.; Mr. Cornell; H. L. Hartzell, Delco-Remy Division, GMC; J. H. Little, Chevrolet Motor Division, GMC; A. V. Nichol, Philco Radio Corp.; M. E. Piper, Colonial Radio Corp.; W. G. Schneider, Electric Auto-Lite Co.; F. C. Stromatt, Willys-Overland Motors, Inc.; Charles W. Thomas, Ford Motor Co., and T. E. Wagar, Studebaker Corp.

Investigates Nomenclature Of Truck and Trailer Terms

QUESTIONNAIRES, seeking to explore the desirability for undertaking a project covering nomenclature for trucks and trailers, are being sent to members of the SAE Transportation & Maintenance Activity. This was authorized by the SAE T&M Technical Committee on Oct. 4.

Considerable confusion in terms, both among vehicle designers and operators, was reported at the meeting. Before launching a detailed study, the committee thought it advisable to sound out a wider segment of the industry by means of a questionnaire.

Engine Valve Repair Found To Be Costly

DESPITE high cost, repair of burned and guttered engine valves was found to be practicable, the SAE Transportation & Maintenance Ordnance Vehicle Maintenance Committee has reported to the Army Ordnance Department.

In its report, "Reclamation of Engine Valves," the Engine Valve Committee divides the used valves into six groups, each determined by the degree of burning of the seat, guttering, and stem wear. Valves in the sixth group were bent, broken, and generally considered to be beyond repair.

Valves in the first group were satisfactorily repaired by merely grinding the seats and sometimes the tip. These simple operations could be performed in any repair garage.

The second group was valves guttered, or pounded on the seats to such an extent that refacing would reduce the head diameter or cause knife edging at the periphery. The report shows how these valves were satisfactorily repaired, although the cost increased considerably over the valves in the first group.

When valve seats are deeply burned or cracked, the repair cost further increased, and the life expectancy of Group Three was unpredictable. If new valves had been available, the report said, the valves in this condition should have been scrapped.

Valves in conditions worse than Groups One, Two, and Three were found to be costly to repair, and life expectancy unpredictable. Equipment to do these repairs is not generally available, but repair can be resorted to in some cases where new valves are unobtainable, the report said.

The 16 members of the Committee on Reclamation of Engine Valves was headed by Norman Hoertz, Thompson Products, Inc. Committee members included Andrew J. Brezina and Arthur Townhill, also with Thompson Products, Inc., Reynolds V. Cox, Aluminum Industries, Inc.; E. P. Gohn, SAE vice-president for T & M and engineer with Atlantic Refining Co.; J. C. Hale, Cleveland, Columbus & Cincinnati Highway, Inc.; Frederick J. Kelly, Wilcox Rick Division, Eaton Mfg. Co.; L. V. LaRou and J. C. Long, both with Wall-Colmonoy Corp.; A. W. Lindblad, Metallizing Co. of America; Howard Osburn, Red Star Transit Co.; Bryan Park, Central Greyhound Lines, Inc.; William G. Piwonka, Cleveland Transit System; Harry E. Potter, Sealed Power Corp.; J. R. Spence, formerly with Stoody Co., and W. A. Wissler, Union Carbide & Carbon Co.

The 19 page report, illustrated, is available to SAE Members at 50¢ and to nonmembers for $1.00 from the SAE Special Publications Department, 29 West 39 Street, New York 18, N. Y.

Police Chiefs Award Citation to SAE

THE Board of Directors of the International Association of Chiefs of Police has awarded the organization's Citation to the SAE for assistance in the IACP nationwide Brake Emphasis Program, SAE President James M. Crawford announced.

Robert E. Raleigh, acting director of the police chiefs' organization, pointed out that this was another example of wide-scope cooperative effort between engineers of the automotive industry in the interest of the public safety.

Dutch SAE Members Hold Meetings Despite Nazis

SAE reserve members in The Netherlands, which was under Nazi military occupation from May, 1940, until 1945, continued to hold informal SAE meetings until war conditions prevented. Voluntary transportation strike started by the Dutch in September, 1945, to upset Nazi transport operations created travel difficulties. Punitive measures taken by the Nazis thereafter brought on starvation, deprivation, and other difficulties.

SAE meetings were bright spots in lives made dull by Nazi occupation, according to J. Jan Broeze, of Delft, recently in the United States. Mr. Broeze and his fellow engineers found it possible to continue laboratory work with some restrictions.

Among other SAE reserve members active were: C. H. Buitenhuis, of Heemstede; A. L. J. M. Fick, of Breda; Alexander J. Mollinger, of Delft; Dr. Herman Coenraad Olivier, of Endhoven; Major E. W. Rahusen, of Velp; Alfred L. W. Seyffardt, of De Steeg; Albert E. M. Sadee, of Wassenaar; and Max R. Smit Kleine, Robert Tijken, and J. W. Van Wamelen, Jr., all of The Hague.

Name Change Proposed

THE Passenger Car Body Activity has requested that the SAE Council approve changing of the Activity's name to "Body Activity." Final action has been deferred until the next meeting of the Council at the request of Passenger Car Body Vice-President Walter T. Fishleigh, so that the Truck & Bus Activity Committee may have an opportunity to express its views on the proposal.

SAE Helicopter Group Progresses

GERMAN research and development on helicopters was revealed by Chairman R. H. Prewitt of the Helicopter Committee of the SAE Special Aircraft Projects Subdivision following a meeting on Oct. 2 and 3 in Philadelphia. The last day's session was attended by representatives of the industry to learn at first hand what an Army Air Forces mission had discovered in Germany.

The German work on rotary wing aircraft has been respectable, and it was agreed by committee members that many of the detailed reports brought back would be helpful for their disclosures of technical phases, mathematical work, and in the field of jet propulsion.

One of the craft described was the Dobelhoff jet-propelled helicopter. Study of the report did not reflect the glow of earlier newspaper accounts about the performance of this Austrian development, but did show a number of intriguing engineering possibilities. The NR-4, the last of the four experimental models hovered for about 25 hr. Gross weight, including pilot and fuel, was 1480 lb. It is powered by a conventional powerplant of 135 hp, which drives a centrifugal blower at 36,000 rpm, and delivers air at 1.4 atmospheres.

In describing the powerplant, Mr. Prewitt, Kellett Aircraft Corp., said the jet is heated by passing through a heat exchanger at the exhaust manifold, and is then introduced into the jet air stream just behind the blower.

To prevent backfire, the fuel is not turned on until the air flow through the blade is greater than the flame propagation through the oval shaped spar tube. Flame propagation is 3 or 4 m/sec, whereas the air flow is approximately 200 m/sec or 658 ft/sec.

Only about 65% of the fuel burned, and most of that after leaving the jet. An air-slot cooled sparkplug is used to initially ignite the gas at the tip of the blade.

By altering the shape of the jet it was possible to get intermittent explosions at the rate of 270/sec, using the hollow blade and ducting as an organ pipe. Under this arrangement the peak pressure reaches from 10 to 20 atmospheres and combustion is 98%.

Fuel consumption, while hovering, is 368 lbs/hr, fuel consumption of the jets is 298 lbs/hr, that of the conventional internal combustion engine is 70 lbs/hr. Blower efficiency is 69% and ducting loss amounts to a pressure drop of 15%.

The jet thrust per blade is 26.5 lb with top speed of 788 ft/sec, which gives a total power conveyed to the rotor, or power available, of 114 hp. This brings specific fuel consumption to 3.23 lbs/hp hr. The three blades of 16.4 ft radius and 6 in. chord, NACA profile, revolve at 300 rpm. The blades have a 0.10 in. thick oval tube to form the leading edge and to constitute the duct.

Dobelhoff engineers commented that because fuel was exhausted in about 15 min and because performance was marginal, a logical approach might be to build an autogyro type of aircraft with the engine driving the tractor propeller, and the jet serving only to give assisted take-off and landing.

Another German disclosure indicated that the U. S. Army's decision in canceling its contracts for the twin side-by-side type of helicopter was premature. The original Focke Achgelis type of helicopter which attracted attention in 1935, earned sufficient favor to have 21 of the 223 model built between 1939 and 1945 and about 100 were being manufactured when war ended. These machines had a gross weight of 7050 lb, and were capable of carrying a crew of six, and a useful load of 2200 lb. It had top speed of 118 mph, a vertical rate of climb of 1200 to 1500 fpm. A captured German film showed operations which increased the mobility of mountaineering troops in difficult terrain with supplies including field guns which were carried in a loading net swinging at the end of a 100-ft cable.

Another report was that of the Anton Flettner helicopter which has two rotors intermeshed, somewhat similar to the Kellett XR-8. The axes of its two double bladed rotors were only about two feet apart. Moving pictures of the Flettner FL 282 showed remarkable maneuverability, particularly for a machine having such a high loading per hp.

Distribute German Reports

The 38 German reports on helicopter development are being distributed to interested manufacturers for translation. Dr. Alexander Klemin was named by the committee to review and edit the translated reports with view of making them available to interested engineers through SAE Headquarters.

Serving with Chairman Prewitt on Committee S-2, Helicopters, are Com. R. E. Doll, Bureau of Aeronautics, Navy Department; Michael E. Gluhareff, Sikorsky Aircraft; J. P. Perry, G & A Aircraft, Inc.; Frank Piasacki, P-V Engineering Forum; Stephen H. Rolle, Civil Aeronautics Administration, Aircraft Engineering Division; Marshall C. Smith, Platt-LePage Aircraft Co.; Major K. S. Wilson, Chief, Torary Wing Branch, Aircraft Projects, AAF Air Technical Service Command, and R. A. Wolf, Bell Aircraft Co.

Investigation on Plastic Glazing Being Undertaken

CONSIDERATION of the question of use of transparent plastics for glazing motor vehicles will be undertaken by a committee under the sponsorship of R. H. McCarroll, Ford Motor Co., executive engineer, as an SAE Technical Board project.

The subject is one of interest to vehicle manufacturers, state motor vehicle administrators, and the Interstate Commerce Commission, which posed the question of egress from buses if the glazing tended to imprison passengers in the case of a wreck.

Laws in most states, it was pointed out, require that all motor vehicles must be glazed with safety glass of an approved type. With the prospect of the use of transparent plastics, state motor vehicle administrators are in a quandary in view of lack of information. It would be necessary in some states to have the laws amended in the light of engineering reports, it is believed.

Mr. McCarroll is organizing a committee of automotive vehicle, safety glass, and plastic manufacturers, and will submit a proposed group and a chairman of the SAE Technical Board. The projected report of the group would be transmitted to the American Standards Association for appropriate consideration.

Special Additive Agents In Steels Discussed

IMPORTANT economies in the manufacture of automobiles and trucks were pointed out to the automotive industry recently.

Wartime development of heat treating, it was pointed out, has demonstrated the value of the special additive agents, which if adopted instead of the more generally used 4340, might reduce costs.

Thus, it was pointed out, concerted action on the part of the steel users would save considerable money, in extra charges, over the previously used high alloy steels.

The report to the SAE War Engineering Board Iron & Steel Committee, Sept. 17, was made by H. W. Knowlton, International Harvester Co., when members of the group proposed the elimination of unnecessary high alloy steels.

Adds Two to Group On SAE Manual

OTTO KIRCHNER, Chairman of SAE Committee S-1, Aeronautical Drafting Manual, announced the appointment of Prof. S. B. Elrod of Purdue University, and H. F. J. Skarbek, Breeze Corporations, Inc.

Prof. Elrod was named to serve as a liaison member between the SAE Committee and the Society for Promotion of Engineering Education. It was felt that the addition of a member from the educational field would serve to steer the future pursuits of the committee along lines parallel to those being currently taught in universities and colleges.

The SAE Aeronautical Drafting Manual Committee was formerly known as SAE Committee E-8, Aeronautical Engine Drafting Manual. About eight months ago the industry recognized the need for expanding this committee to a broader scope. The committee now is preparing drafting prac-

tices pertinent to the aircraft engine, accessory, equipment and propeller industries, and also the airline operators. The committee in turn has been expanded to include cognizant engineers from those industries.

One of the primary projects of the committee is the revamping of the manual which was prepared by the old Committee E-8 into a working article for the expanded group. At the same time this revamping is being done, the committee plans to add many new and useful items to the new manual. March 1, 1946, has been set for date of printing first draft of the new manual.

Group Gets Reports On Residuals in Steel

WARTIME concern of the automotive industry in respect to the large amounts of residual alloys in steels appears to have vanished with the defeat of Japan, the Iron & Steel Committee of the SAE War Engineering Board was told at its meeting on Sept. 17.

The SAE 4800 series still shows considerable chromium residue, in the experience of R. W. Roush, Timken-Detroit Axle Co. Some of the other series show such low residual that the committee agreed upon dropping further checking as a committee policy.

However, R. B. Schenck, Buick Motor Division, General Motors Corp., is continuing investigation of residuals in the SAE 1300 series in the future, he told the committee.

Because of the general use of high alloy scrap in making steels in the war production program of the United States, steel mills were forced to supply low carbon and other low-alloy types of steels with other-than-specified residuals.

Tracklayer Test Work To Be Continued by SAE

DESPITE the end of the war, the Army Ordnance Department, Corps of Engineers, and the Navy are interested in continuing the research and test work on the behavior of tracklayers in various types of mud, and Chairman E. F. Norelius of the SAE Tractor War Emergency Committee named a subcommittee on Sept. 10 to lay out a coordinated program.

Earlier stages of the work have been done at the Auburn, Alabama, farm tillage laboratories of the Aberdeen Proving Ground; the Proving Ground at Aberdeen, Maryland; the Alabama Polytechnic Institute, and were participated in by Army officers, Department of Agriculture experts, college specialists and automotive engineers.

Detailed reports have been written and widely studied, and the committee agreed with Army officers that continued work should be guided by a carefully prepared agenda.

Chairman of the new subcommittee is Paul Huber, General Motors Proving Ground, and working with him are H. E. Churchill, Studebaker Corp.; E. Waldo Stein, Firestone Tire & Rubber Co., and W. E. Zierer, Chrysler Corp. Consultants are F. A. Kummer, Alabama Polytechnic Institute, and Prof. R. F. Legget, Toronto University. They will submit a Steering Program Recommendation.

SAE Coming Events

Baltimore – Nov. 8

Engineers Club; dinner 7:00 p.m. Subject: Baltimore's Future in International Aviation. Speakers – Major-Gen. Julian L. Schley, Baltimore Airport, Avery McBee, director of public relations, Glenn L. Martin Co.

Buffalo – Nov. 14

University Club; dinner 7:00 p.m. Supercharger Analysis – R. J. S. Pigott, chief engineer, Gulf Research and Development Co.

Chicago – Nov. 13 and 19

Nov. 13 – Knickerbocker Hotel; dinner 6:45 p.m. Passenger Car Meeting and Old Timers Night. Cars and Men of Old and Their Challenge to You – Fred E. Moskovics, industrial consultant, A. O. Smith Corp.

Nov. 19 – LaSalle Hotel, South Bend; dinner 6:45 p.m. Helicopter and Auto Giro

Rotocraft Construction – R. H. Prewitt, vice-president and chief engineer, Kellett Aircraft Co.

Cincinnati – Nov. 8

Alms Hotel; dinner 6:30 p.m. Diesel Engine Development (Automobile Types) – John A. Watts, factory representative, Cummins Engine Co.

Cleveland – Nov. 12

Cleveland Club; dinner 6:30 p.m. Radar – E. W. Engstrom, RCA Laboratories.

Detroit – Nov. 1, 12, 21

Nov. 1 – Horace H. Rackham Educational Memorial Bldg.; meeting 7:30 p.m. Chemical Bonding of Metal Parts – Don Swayze, Chrysler Corp.

Nov. 12 – Horace H. Rackham Educational Memorial Bldg.; dinner 6:30 p.m. Vehicle Tires – Design and Flotation Problems – R. D. Evans, manager, tire design research, Goodyear Tire & Rubber Co. Port and Harbor Work in Michigan – Col. Allison Miller, U. S. Engineers. Dinner Speaker – Prentice Brown, Detroit Edison Co. Motion Picture.

Nov. 21 – Horace H. Rackham Educational Memorial Bldg.; meeting 7:30 p.m. Better Methods and the Product Engineer – G. J. Bates, General Motors Corp. Exhibit.

Indiana – Nov. 8

Antlers Hotel, Indianapolis; dinner 6:45 p.m. High Frequency Ignition for Automobiles – A. C. Wall, ignition consultant, P. R. Mallory Co.

Kansas City – Nov. 13

Continental Hotel; dinner 6:30 p.m. The Future Motor Fuel Picture as the Refiner Sees It – A. L. Foster, refining editor, Petroleum Publishing Co.

Metropolitan – Nov. 1

Pennsylvania Hotel, New York; meeting 7:45 p.m. Development of the Passenger Car – Henry Crane, vice-president, General Motors Corp. Present Day Requirements To Be Met by Passenger Car Designers – W. S. James, head of engineering, Ford Motor Co. Future Automobile Design Possibilities – W. B. Stout, director of research, Consolidated Vultee Corp.

Milwaukee – Nov. 2

Milwaukee Athletic Club; dinner 6:30 p.m. Engineering Trends – Alex Taub, Alex Taub Associates.

Mohawk-Hudson Group – Nov. 7

Engineering Bldg., Union College, Schenectady; meeting 8:00 p.m. Gas Turbine Development – R. T. Sawyer, engineer, diesel equipment, American Locomotive Co.

New England – Nov. 6, Dec. 4

Nov. 6 – Engineers Club, Boston; dinner 7:00 p.m. Production and Heat Treatment of Quality Forgings – A. J. Pepin, chief metallurgist, Wyman-Gordon Co.

Dec. 4 – Engineers Club; meeting 6:30 p.m. Considerations Affecting Fuels and Lubrication from the War Work – R. J. S. Pigott, chief engineer, Gulf Research & Development Co.

Northern California – Nov. 12

Engineers Club, San Francisco; dinner 6:15 p.m. Theory of Probabilities Applied to the Manufacture of Diesel Engines – Lt.-Com. W. S. Everett.

Northwest – Nov. 2

Gowman Hotel, Seattle; dinner 7:00 p.m. Transmissions – Important Details – Thomas Bachus, chief engineer, Fuller Mfg. Co.

Peoria – Nov. 26

Jefferson Hotel; dinner 6:30 p.m. Speaker and subject to be announced.

Pittsburgh – Nov. 27

Webster Hall; dinner 6:30 p.m. Tailored Fuels for Post-War Motors – Dr. W. A. Gruse, Mellon Institute and H. C. Hunter, Gulf Research and Development Co.

St. Louis – Nov. 13

Congress Hotel; dinner 6:30 p.m. Hydraulic Torque Convertors as Applied to Track-Laying Vehicles. Speaker to be announced.

Salt Lake Group – Nov. 12

Newhouse Hotel; dinner 7:00 p.m. Automotive Engine Bearing – R. A. Watson, Federal Mogul Corp.

Southern California – Nov. 1

Biltmore Hotel, Los Angeles; Aircraft and Air Transport Session – Icing Symposium: A Report on the Nature of Ice Formation on Aircraft as Related to Airline Operation – Capt. C. M. Christensen, United Air Lines. The Airplane Icing Problem and Its Alleviation Through Applied Research – Alun R. Jones, National Advisory Committee for Aeronautics. Aircraft Powerplant Session – Factors Pertaining to the Installation of In-Line Air Cooled Engines – T. Hammen, Jr., and W. H. Rowley, Ranger Aircraft Engines. An Electrical Model for the Investigation of Crankshaft Torsional Vibrations in an In-Line Engine – Hugh B. Stewart, Allison Division, General Motors Corp. Aircraft Session – Brake Symposium: Research and Development of Aircraft Accumulators – K. C. Monroe, Vickers, Inc. Power Brake Valves – E. F. Loweke, Hayes Industries, Inc. Discussion by: E. K. Lasswell, ATSC, Wright Field and Howard Field, consultant. Air Transport Session – Economics of Airline Fuel Utilization – W. V. Hanley and A. Hundere, California Research Corp. Cruising Economy by Use of Water Injection – D. C. Eaton, Wright Aero, Ltd. Aircraft General Session – General Requirements for Helicopter Engines – C. T. Doman, Aircooled Motors Corp. Helicopter Design Problems – Fred Landgraf, Landgraf Helicopter Co., Inc. Helicopter Movie – Bell Aircraft Corp.

Southern New England – Nov. 7

Bond Hotel, Hartford; dinner 6:45 p.m. Gas Turbines – C. R. Soderberg, professor, Massachusetts Institute of Technology.

Spokane Group – Nov. 9

Desert Hotel; dinner 7:00 p.m. Winterized Lubrication – Wayne Goodale, Standard Oil Co. of Calif.

Twin City Group – Nov. 1

Curtis Hotel, Minneapolis; dinner 7:00 p.m. Gas Turbines and Aircraft – F. W. Godsey, Jr., Westinghouse Electric Corp.

Washington – Nov. 8

Dodge Hotel; meeting 8:00 p.m. A Preview of the Flight Age – George A. Fuller, trade association manager, United Air Lines. Slides and Motion Picture.

Western Michigan – Nov. 22

Occidental Hotel, Muskegon; meeting 7:45 p.m. China-Burma-India War Theater – Errol J. Gay, Ethyl Gasoline Corp. Motion Pictures.

Wichita – Nov. 15

Broadview Hotel; dinner 6:00 p.m. Rocket and Jet Propelled Engines. Speaker to be announced.

About SAE MEMBERS

cont. from p. 38

SCOTT B. BARNHARDT is now design engineer, Shovel & Crane Division, Lima Locomotive Works, Inc., Lima, Ohio. He was formerly project engineer, Bendix Products Division of Bendix Aviation Corp., South Bend, Ind.

GEORGE W. GILMER, III, U. S. Army, has been promoted to the rank of lieutenant colonel and is now serving with the Aircraft Maintenance & Engine Division, Air Transport Command, Gravelly Point, Va.

Formerly a student member at the Case School of Applied Science, Cleveland, **JACK R. KULLMAN** is now in the USNR and is attending midshipmen's school at Fort Schuyler, N. Y.

Until recently flight test engineer and aerodynamist, Packard Motor Car Co., Toledo, Ohio, **L. A. HOWARD** is now flight test section head with the same firm in Ypsilanti, Mich.

ROBERT R. ADAMS, who had previously been a student member at the University of Colorado, is now attending the USNR Midshipmen's School at Notre Dame, Ind.

EDWIN L. FISHER is now mechanical engineer with the Hart-Carter Co., Lauson

Division, New Holstein, Wis. He was formerly project engineer, Dodge Chicago Plant, Division of the Chrysler Corp., Chicago.

Formerly supervisor, test cell design and maintenance, Dodge Chicago Plant, Division of Chrysler Corp., Chicago, **ROBERT F. KRUPP** has been named project engineer, Jack & Heintz, Inc., Cleveland.

A. E. KOLBE is now engine design engineer with Chevrolet Motor Division, General Motors Corp., Detroit. He was formerly quality engineer with the same company in Tonawanda, N. Y.

Formerly a student member at Yale University, New Haven, Conn., **FREDRICK J. POMMER** is now technical assistant in the hydraulic section of the engineering department of the Farrel-Birmingham Co., Inc., Ansonia, Conn.

Formerly manager of the automotive department of the S. K. Wellman Co., Detroit, **MALCOLM S. ADLER** is now sales engineer with the F. J. Stokes Machine Co., Chicago, Ill.

ROSS L. RICHARDS, formerly sales manager, replacement sales department, Prestolite Battery Co., Ltd., Toronto, Ont., Canada, is now with General Dry Batteries of Canada, same city.

JOHN F. STURGEON is now chemical engineer with Lago Oil & Transport Co., Ltd., Aruba, Netherlands West Indies. He was formerly Director of Gas, Analytical & Fuel Testing Laboratory, Root Petroleum Co., El Dorado, Ark.

Formerly an engineer in the New Projects & Development Department of Fairchild Engineering Co., Cleveland, **KARL FEILCKE** is now manager of the branch office at New York City.

Formerly general foreman in the production engine test department of Wright Aeronautical Corp., Woodridge, N. J., **CHARLES V. BONHAG,** a student member at the Newark College of Engineering, Newark, N. J., is now test equipment engineer at the Paterson branch of Wright Aeronautical Corp.

JACK RISMAN, a student member at CCNY, New York City, is now draftsman with H. W. Faeber, same city.

Formerly a student member at Northwestern Technological Institute, Evanston, Ill., **E. SCOTT NICHOLS** is now an ensign in the USNR, and may be contacted c/o Fleet Post Office, San Francisco.

NUH ERGENEMAN, a former student member at the University of Michigan, Ann Arbor, Mich., is now test engineer with the Hudson Motor Car Co., Detroit.

Formerly at General Motors Institute, Flint, Mich., **WILLIAM A. BAKEWELL** is now a private in the U. S. Army and may be reached at Camp Joseph T. Robinson, Ark.

H. G. PRALL is now manager of the Service Division of Wright Aeronautical Corp., Paterson, N. J. He was formerly quality manager of the same company in Cincinnati, Ohio.

Formerly assistant manager of the engine department of the Caterpillar Tractor Co., Peoria, Ill., **GEORGE P. FENN** is now general sales manager of the Witte Engine Works Division of Oil Well Supply Co., Kansas City, Mo.

Formerly designer with the Caterpillar Tractor Co., Peoria, Ill., **RAYMOND Z. BROWN** is now layout engineer working on diesels for Baldwin Locomotive Works, Philadelphia.

C. N. THOMPSON, A. O. Smith Corp., has returned to Detroit to serve as automotive engineering representative for that firm. Mr. Thompson was aviation representative for his company on the West Coast for four years.

Returning to his civilian occupation after serving five years in the Royal Air Force as an instructor, and later on operations in the Pacific zone, **R. J. F. PORTER** may now be reached at the Colonial Motor Co., Ltd., Wellington, N. Z., where he is situated as service manager.

Formerly district manager of the Seattle, Wash., branch of Thompson Products, Inc., **G. C. COLLINS** is now service field engineer with the same firm, Cleveland, Ohio.

CHARLES E. McCUAN is now manager of engineering sales of Aero-Coupling Corp., Burbank, Calif. He was formerly engineering representative, Aeroquip Corp., Los Angeles.

Formerly mechanical development engineer with Timken Roller Bearing Co., Canton, Ohio, **HENRY McKEEN, JR.,** is now district representative, National Tube Co., Tubing Specialties Division.

DAVE SWEDLOW has been named general manager of the Plastics Division of Shellmar Products Co., Mt. Vernon, Ohio.

He was formerly president of Swedlow Aeroplastics Corp., Glendale, Calif.

FELTON H. HAVINS, who had formerly been assistant material superintendent, Guiberson Corp., Dallas, Tex., is now process engineer with Luscombe Airplane Corp., Trenton, N. J.

J. BRUCE McELHONE is now a motor machinist's mate in the U. S. Navy and is serving somewhere in the Pacific area. Before entering the Navy, he was shop foreman, A & T Auto Parts, Astoria, L. I., N. Y.

RICHARD K. SNIVELY has been named account executive, St. Georges & Keyes, Inc., New York City. Mr. Snively was formerly technical adviser, Magnesium-Aluminum Products, Revere Copper & Brass, Inc., Baltimore, Md.

Formerly resident engineer, Chicago Ordnance District, Massey-Harris Tank Plant, Racine, Wis., H. E. ROMBERG is now assistant chief automotive engineer for Hayes Mfg. Co., Grand Rapids, Mich.

OBITUARIES

William H. Clark

William H. Clark, who had been president of Alox Corp., New York City, died April 25. He was 59 years of age. As president of the Alox Corp. for nearly 20 years, Mr. Clark led the organization in the research and manufacture of additive materials for the improvement of lubricating oils for automotive, aeronautic, and industrial uses. He received his degree of A.B. from Hobart College in 1907 and attended the law school of New York University from 1909 to 1911.

Robert B. Rothwell

Robert B. Rothwell, chief engineer, Draper Motors Corp., Detroit, died recently at the age of 45. Since 1943, Mr. Draper, as chief engineer of the Draper organization, had been in charge of all processing, tool design, and quality control of war products. After receiving his B. S. degree from the U. S. Naval Academy at Annapolis, Md., in 1922, he served as a lieutenant commander in the U. S. Navy, specializing particularly in the design, development, testing, and operating of submarine diesel engines. He left the Navy in 1938 to become field engineer with the Mechanical Engineering Service Co., Detroit.

Arthur J. Sikora

Arthur J. Sikora, product engineering manager of Wright Aeronautical Corp., Cincinnati plant, died July 17. Before his appointment as manager of product engineering at Wright, Mr. Sikora was division head of the engineering department. He was with Wright in Paterson, N. J., from 1928 until 1940, when he was transferred to the Cincinnati plant. He took courses in chemical engineering and metallurgy at both Pratt and Stevens Institutes.

Birger G. Olson

Birger G. Olson, chief engineer of General Machinery Corp., Hamilton, Ohio, died recently at the age of 41. Before becoming chief engineer of the General Machinery Corp. in 1940, Mr. Olson was a mechanical engineer with the U. S. Navy Department. Prior to that served with the American Locomotive Co., Auburn, N. Y., in an engineering capacity. He attended the University of Mittweida in Germany and received his degree of M. E. from there in March, 1924.

George H. Coulson

George H. Coulson, factory representative for Dorman Products, Inc., West Coast branch, died of a heart attack, Aug. 20. After completing a course in mechanical engineering at Drexel Institute in Philadelphia in 1913, he joined the Mercer Auto Co. in Trenton, N. J. He was a supply sergeant in the U. S. Army in 1917, and later joined the William Morriss Co., Tex., where he was manager of the parts department. Shortly after he left Commercial Brake Service, Los Angeles, Calif., of which he was a partner, he joined the Dorman organization.

James E. Garner

James E. Garner, superintendent of motor transportation, Union Electric Co. of Mo., St. Louis, Mo., died July 19 at the age of 48. In 1918 he joined the Portland Garage Co. as superintendent of the garage and had charge of the service department. From 1921 until his death, he served with the Union Electric Co. of Mo. He had complete charge of maintenance and purchase of automotive equipment and supplies for the firm. He became a member of SAE in 1939.

Division, New Holstein, Wis. He was formerly project engineer, Dodge Chicago Plant, Division of the Chrysler Corp., Chicago.

Formerly supervisor, test cell design and maintenance, Dodge Chicago Plant, Division of Chrysler Corp., Chicago, **ROBERT F. KRUPP** has been named project engineer, Jack & Heintz, Inc., Cleveland.

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Arthur M. Clark

Arthur M. Clark, experimental engineer with Hercules Motors Corp., Canton Ohio, died recently at the age of 53.

Mr. Clark had been associated with the Hercules organization since 1920, when he started there as supervisor of the test room. Soon after that assembly line supervision was added to his duties and in 1930, he was made experimental engineer, the position he held when he died. He was elected to member grade in the Society in 1928.

■

GLIDDEN S. DOMAN is now the president and chief engineer of Doman-Frasier Helicopters, Inc., New York City. He was formerly dynamic test group engineer, Sikorsky Aircraft, Division of United Aircraft Corp., Bridgeport, Conn.

Formerly gear engineer with Borg-Warner Corp., **C. W. FLOSS** is now assistant chief engineer, Detroit Gear Division of the same firm, Detroit.

W. A. WISEMAN has been named assistant chief engineer of the Aircraft Engineering Division of Continental Motors Corp. of Muskegon, Mich. He had been associated with the Warner Aircraft Corp. of Detroit.

Formerly a student member at Tufts College, Medford, Mass., **WILLIAM M. DOWDEN** is now an ensign in the USNR and may be contacted c/o Fleet Post Office, New York City.

J. R. ALPHIN has been transferred from the Navy Department, Transfer Branch, Washington, D. C., to Domestic Transportation Office, Navy Yard, Charleston, S. C.

T. HARDGROVE is now associated with the International Nickel Co. of Bayonne, N. J.

WILLIAM V. HANLEY, who had been technical representative for Standard Oil Co. of Calif., San Francisco, is now assistant manager of the Aviation Division of the same firm.

Formerly liaison engineer with Ford Motor Co., Dearborn, Mich., **HALBERT S. MARTINSON** is now the owner and manager of the Century Automotive Service of Long Beach, Calif.

C. WILLIAM SIDWELL is now experimental test engineer with the Elliott Co. of Jeannette, Pa. Mr. Sidwell was formerly powerplant aerodynamicist, Bell Aircraft Corp., Niagara Falls, N. Y.

Formerly field representative, Glenn L. Martin Co., Baltimore, Md., **ROBERT A. HERMANN** is now associated with Edo Aircraft Corp., L. I., N. Y.

HARRY S. PACK is now affiliated with P-V Engineering Forum, Inc., Sharon Hill, Pa. He was formerly director of functional engineering and air cargo development of Pennsylvania-Central Airlines, Washington.

Formerly assistant sales manager of Twin Disc Clutch Co., Racine, Wis., **EDWIN C. BILLINGS** is now sales manager of the same firm.

E. SHERMAN SMITH has been named chief engineer of the Plastic Coating Corp. of Holyoke, Mass. He was formerly plant equipment engineer of Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn.

A. CHAPLINSKI, a student member at

the Detroit Institute of Technology, Detroit, is employed as a pattern maker at the Windsor Pattern Works, Windsor, Ont., Canada.

Formerly manager of the Synthetic Rubber Division of the U. S. Rubber Co., Los Angeles, Calif., **F. S. CARPENTER** may now be reached at the Plantations Division of the same firm, New York City.

R. G. DeLONG has been appointed sales manager of the Hydraulic Division of the Twin Disc Clutch Co. of Rockford, Ill. He was formerly installation engineer with the same company.

A student member at Fenn College, Cleveland, **C. R. GEPHART** is employed as tool designer by the Reliance Electric & Engineering Co., same city.

JOSEPH J. MIZER has been named assistant chief engineer of the John Oster Mfg. Co., Racine, Wis.

WILLIAM W. DUNNELL, JR., has been named chief engineer of Rivett Lathe & Grinder, Inc., Boston, Mass. He had been chief engineer of the Industrial Cooperation Division, Project 6060, M.I.T., Cambridge, Mass.

A. L. KAYE has been named vice-president and general manager of the Beckman Supply Co. in Hammond, Ind. Mr. Kaye, a former member of the SAE Iron & Steel Division, will be concerned primarily with fleet operation in his new position. He was formerly metallurgical engineer, alloy, with the Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

Recently returned from one and one-half years' service in Italy with the American Field Service, **JAMES C. HUGHES** is now connected with the Ethyl Corp., Research Laboratories, Detroit, Mich.

W. E. BURNETT is now assistant chassis engineer with Cadillac Motor Car Division, General Motors Corp., Detroit. He was formerly assistant section engineer, body department of the same company. He also served for a time as technical observer for the U. S. Army overseas.

MARVIN D. GRUSH, USMC, has been promoted from first lieutenant to captain and his new address is 5th M. T. Battalion, 5th Marine Division, c/o Fleet Post Office, San Francisco.

Until recently executive vice-president of Cargair, Inc., Los Angeles, **G. O. NOVILLE** is now associated with the Shell Co. of Ecuador, Ltd., Quito, Ecuador, S. A.

WARREN V. PRINCE is now president and chief engineer of Prince Industrial Plastics Corp. of Cleveland.

JAMES D. PEARSON, who formerly was technical production engineer in the Glasgow Plant, Hillington, Scotland, of Rolls-Royce, Ltd., is now serving in the Montreal, Que., Canada, branch of the same firm in the capacity of chief technical services engineer.

Formerly field engineer with United-Carr Fastener Corp., Detroit, **GEORGE F. CRAM** has been transferred to the Cambridge, Mass., branch of the firm.

S. J. CHENEY is now a project engineer with the Nash Research Engineering Department of Nash-Kelvinator Corp. He had been design engineer with GM Central Office Engineering, Transmission Development Section.

LAWRENCE B. WHIT has been appointed Director of Finance, Citizens Public Expenditure Survey of N. Y. State, Albany, N. Y. He had previously been director of organization and public relations, Rhode Island Public Expenditure Council, Providence, R. I.

Formerly salvage engineer with Chrysler Corp., Highland Park, Mich., **CARROLL L. WALKER, JR.,** is now employed in the engineering research department of the University of Michigan, Ann Arbor, Mich.

After completing his wartime assignment as manager of the Buhl Building Office, Liaison Ordnance Department, General Motors Corp., Detroit, **JOHN D. RIGGS** has returned to Washington to continue his prewar activities, consisting of sales of General Motors' cars and trucks to Federal Government agencies.

JOSEPH RICHTER is now plant engineer for the Twin City Mfg. Co., Norfolk, Va. He was formerly assistant project engineer with Wright Aeronautical Corp., Paterson, N. J.

Formerly supervisor of maintenance, Hertz Drivurself Stations, Inc., Chicago, **R. A. DESMOND** is now associated with the GMC Truck & Coach Division, General Motors Corp., Technical Service Department, Pontiac, Mich.

T. L. ROBINSON, who had been chief engineer, Amplex Division of the Chrysler Corp., Detroit, is now associated with the S. K. Wellman Co., Cleveland.

WILLIAM J. SUMMERFIELD has been promoted to the position of superintendent of maintenance, Motor Haulage Co., Inc., Brooklyn, N. Y.

APPLICATIONS Received

The applications for membership received between Sept. 10, 1945, and Oct. 10, 1945, are listed below. The members of the Society are urged to send any pertinent information with regard to those listed which the Council should have for consideration prior to their election. It is requested that such communications from members be sent promptly.

Baltimore Section: Harry R. Annesley, Jr., Garth L. Bair, John C. Hale.

Buffalo Section: Bartram Kelley, D. R. McRitchie.

Canadian Section: British American Oil Co., Ltd., John Chanik, Joseph C. O'Neil, Rowland Pepper, William Morris Shipitalo, Norman Stone, Frederick Gordon Willmot.

Chicago Section: Alfred J. Corsini, Robert S. Didier, Donald R. Diggs, Frank

E. Farrell, George H. Fetherston, E. M. Kase, Eugene Lieber, George J. Morgan, Paul F. McMahan, Roger E. Schlemmer, Hans S. Smyth.

Cincinnati Section: Howard A. Bischoff, R. K. LeBlond Machine Tool Co.

Cleveland Section: John K. Anthony, John P. Aseff, Joseph J. Berdysz, George A. Borchik, Richard J. Carleton, Jr., Earl William Conrad, Miles William Detling, Gerald W. Englert, John K. Folk, Eugene D. Funk, Robert Gorden Hanneman, Thomas W. James, W. S. Kidder, John Palasics, Bud W. Pasnow, Alvin A. Rood, William D. Stemples, Charles D. Strang, Jr., John K. Tomko, Tom R. Tompkins, James W. Weaver, J. Russell Winch, George Wishnek.

Colorado Group: Dallas Sidney Boyd, Robert J. Emley, John Damude Gordon, George Martin, Austin J. White.

Dayton Section: Everett Palmer Garratt, Willard M. Neff, Gene T. Neudeck, Eric R. Miller.

Detroit Section: Harold G. Axtmann, Robert B. Batchelor, Lawrence W. Becker, Eldred W. Beckman, Gilbert F. Broders, Stanley G. Czarnecki, Jack G. Deakins, Morris R. Graham, Theodore Joseph Hollenkamp, George T. Jones, William C. Kiskow, John Edward Knoblock, Joseph E. Krug, Raymond F. Littley, John P. McCoy, Lt. (jg) Max Myron McCray, Jack Dean McCullough, Clarence L. Meller, Jr., Arthur E. Miller, Kenneth T. Millspaugh, Thomas Willard Milton, Theodore F. Peters, Maurice L. Reifsnyder, Sr., Nicholas E. Rothenthaler, George M. Schueder, Harold W. Small, John T. Spitler, John J. Stewart, Frank A. Swindell, William H. Taylor, Chester C. Utz, Fred P. Van Dame, Edward Lothrop Warner, Jr.

Indiana Section: Robert T. Jackson, Paul C. Zmola.

Metropolitan Section: Capt. Adnan Alpan, Harold A. Batzold, Alphonso Capparelli, Rodney Owen Cochrane, P. A. DePadova, Heinz Hanau, Louis Heimbinder, Roger M. Mahey, Arthur O. Randall, John H. St. John, Albert A. Smith, Jr., Noel Urquhart, Jerome Vegosen, Waldes Koh-I-Noor, Inc., Thomas Forster Wardle.

Mid-Continent Section: Charles R. Evans.

Milwaukee Section: Robert LeFeber Feind, Muir Luken Frey, Phillip Samuel Myers, David W. Rendall, Kurt Rutz.

New England Section: Herbert M. Bevans, Thomas J. Burke, Lt. (jg) Harold S. Hemstreet.

Northern California Section: Beecher Avakian, Rolund Frank DeHoog, G. Weston Embree, Seymour Epstein, Robert A. McCloud, Paul F. Murphy, Judson Hayden Pickup, Major W. C. Wine.

Northwest Section: Lt. Walter M. Mason, Max Reynolds, W. W. Ulin.

Oregon Section: L. C. Faus, Thomas McLoughlin, Hugh Matthew Small, John VanWagenen, Carl Leon Willett.

Philadelphia Section: Lt. Louis Harold Cargill, Albert S. Orr, Carl B. Post, Paul Ribanyi.

Pittsburgh Section: Bernard A. Bannon, Jr.

St. Louis Section: Meredith W. Druif.

Southern California Section: Fred O. Hosterman, Harold M. Jacklin, Jr., Lt. Robert E. Klein, Dave Ian Marlow, Burton Eli Olson.

Southern New England Section: Gifford I. Holmes, George Herbert Mills, Edward E. Kirkham, Melvin Elbert Longfellow, Samuel Jasper Loring, Stanley Zaimor, Jr.

Virginia Group: James I. Ellis, Nathaniel Edward Whitlow.

Texas Section: Dave Hill, A. V. Tice.

Twin City Group: Don A. Plett.

Washington Section: Harold Daniel Danforth, Don Caffery Glassie, John Fitz Hill, William H. Keenan, Robert P. Knighton, A. R. Pierce, Charles W. Tucker.

Western Michigan Section: George C. Andreas, William Henry Kennedy, Daniel J. McQuaid, Jr.

Outside of Section Territory: J. Ardis Barten, Lt.-Com. Charles A. Bender, Jr., Frank A. Hall, Frank Alfred Jones, Lt. George H. Sites, Rae C. Steven.

Foreign: Eric Maximillian Bosson, En-

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NEW MEMBERS Qualified

These applicants who have qualified for admission to the Society have been welcomed into membership between Sept. 10, 1945, and Oct. 10, 1945.

The various grades of membership are indicated by: (M) Member; (A) Associate Member; (J) Junior; (Aff.) Affiliate Member; (SM) Service Member; (FM) Foreign Member.

Baltimore Section: John B. Crane (A), Major Robert P. Powers (J).

Canadian Section: John A. Hines (A), Lt. Herbert Ludovici (M).

Chicago Section: Earl E. Anderson (A), Ray L. Carlson (J), Warren G. Daley (A), Carl W. Ericzon, Jr. (A), Carson E. Dalton (A), W. S. Faurot (A), Chas. Haneline (A), James M. Kirwin (J), Walter James O'Donohue (A), Albert A. Orne, Jr. (A), David R. Osborne, Jr. (J), William L. Rodgers (A), Reginald Arthur Shewry (A), C. A. Sprague (M), H. K. Stenstrom (A), George Edward Thompson (J), B. I. Ulinski (M).

Cincinnati Section: John A. Fox (J), Harold D. Littlejohn (A).

Cleveland Section: Clinton H. Brown (A), John Charles Freche (J), Robert J. Holton (A), E. G. Kimmich (M), John F. McClenahen (A), Zolton Nicholas Nemeth (J), Carl Severin (M), Virgil L. Snow (M), Max Alden Swikert (J), Richard Vollmer (M), David Baker Wood (M).

Colorado Group: William P. Akers (A), 1st Lt. Billy H. Hastings (A).

Dayton Section: David D. Bowe (J), Ernest E. Cleveland, Jr. (J), Raymond J. Darga (J), Capt. Lewis Edward Michael (SM).

Detroit Section: Glenn L. R. Baumhardt (J), Darl F. Caris (M), Frank R. Hinchcliff (J), F. T. Holland (A), Herbert H. Holmes (M), Geo. C. Husbands, Sr. (A), Bruce W. Johnston (A), Howard F. Kidwell (A), Harry H. Lipton (M), Henry W. Mackey (A), Vern C. Markley, Jr. (J), Edward C. Mertz (M), Alexander George Middler (J), Paul Harold Parks (J), Herbert L. Schnell (M), Robert Louis Spicer (J), Jas. Hugh Stone (A), Fred C. Stromatt (M), James T. Wilson (J).

Indiana Section: Earl Arthurs (A), Henry Leonard Elfner (M), William Rayfield Johnson (J), Arthur O. Moneyhun (J), Capt. Edward B. Salmon (J).

Kansas City Section: William L. Beach (A), Andrew Douglas Murphy (J).

Metropolitan Section: Moritz Bierling (A), Harry Warren Burdett (J), Fred Burmann (A), R. Decat (A), Donald E. Drake (J), Bob N. Fassoulis (J), Kenneth Foster (M), Frank K. Fraser (A), Moses M. Jeydel (A), William E. Morris (J), Richard R. Reinheimer (J), Blake Reynolds (M), Henry George Rudolph, Jr. (J), J. William Schnabel (J), Richard H. Vogelmann (J), William Bert Wosenitz (A).

Mid-Continent Section: Wade M. Johnson (M), Harold T. Quigg (M).

Mohawk-Hudson Group: William J. Burke, Jr. (A).

New England Section: Ashley S. Campbell (J), Howard G. Davis (A), John V. Holmes (A), Daniel P. Hurley, Jr. (A).

Northern California Section: Theodor Ehrlich (A).

Northwest Section: Vernon Damm (A), William F. Dunlop (A), Dan R. Huntington, Jr. (A), Russell B. Larson (J), O. A. Riggs (A), William L. Wheeler (A).

Oregon Section: Fred C. Gordon (A), Lt. Stanley F. Patyrak (SM).

Peoria Section: John L. Deffenbaugh, Jr. (J).

Philadelphia Section: Lt. Edwin B. Stafford (A).

Pittsburgh Section: H. Kenneth Siefers (M).

Salt Lake Group: David Brown (A), William R. Clyde (A).

Southern California Section: Seth E. Aldridge (A), Capt. Frank W. Bailey (J), Charles H. Barnes (M), L. A. Billington (A), J. H. Binns (A), Reginald Brenchley (A), Charles L. Fernau (A), Aubrey E., Fraser (A), Leon L. Graham (M), T. F. Harms (M), James M. Hunnell (M), Joe Ming Jay (J), John Patrick Johnston (A), E. D. Krentzman (A), Spyro Kyropoulos (M), Charles B. Large (M), Donald L. Leavitt (A), Frederick A. Matheson (M), Horace Edwin Mead (A), Donald G. Moore (J), Victor Klifton Muzik (M), Vernon L. Peterson (A), Eugene Leonard Pfieffer (A), Alfred C. Robinson (J), Fred H. Rohr (A), H. C. Schultz (A), August F. Schulze (A), Shell Oil Co., Inc. (Los Angeles) (Aff.), Reps: C. W. Ashman, H. H. Black, M. M. De Vine, W. K. Evans, E. McIver, E. A. Mohr; Galen A. Skutt (M), Eric Weiss (J), H. E. Winn (M).

Southern New England Section: Wilbur Lucius Cross, Jr. (M), Lt. Daniel Henry Hudson (J), Simon T. Mitchiner, Jr. (J).

Spokane Group: Albert H. Clark (A), Leslie B. Heywood (A), James J. Williams (A).

Texas Section: Manuel H. Gorin (M), LeRoy Gerald Smith (A), Byron Elwood Snow (A), James W. Walker (M).

Twin City Group: Melvin I. Knutson (M), Russell Huber Whempner (M).

Washington Section: Andrew I. Johnson (J), N. W. Khanine (FM), Lt.-Col. Albert Ladousse (FM).

Western Michigan Section: William E. Williams (M).

Outside of Section Territory: Benjamin H. Adams (A), Harry L. Day (M), Albert C. De Motte (A), Lowell L. Lewis (A), James Stanley Longdon (A), R. J. Mantel (A), Hugh J. P. McKane (A), James Leonard Middleton (A), Ordnance Steel Fdy. Co. (Aff.), Rep: R. H. Swartz; Sidney Herbert Paston (A), Russell Wade Seniff (M), Lt. John Henderson Whyte (J), Lt. Wei-Sheng Wu (J).

Foreign: Arthur W. Bird (FM), England; Alan Raymond Collins (FM), Australia; Government of the Commonwealth of Australia, Dept. of Transport (Depart'l), Rep: R. J. Murphy; Alan Bray Lindley (FM), Australia; John Reginald James Mansbridge (J), England; Anthony Cyril Rudd (J), England; Capt. William Michael Hugh Stevens (J), England; Norman Arthur White (J), England; William Archibald Wilson (FM), England.

Applications Received

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gland; Anthony Churchill Elworthy, New Zealand; Aage C. Jensen, Denmark; G. P. Khandelwal, India; Alf Lysholm, Sweden; A. M. A. S. Mangoury, Egypt; Rae S. O'Hagan, New Zealand; Dahlke Migara Ratnatunga, England; Lionel Stern, Australia; Henry George Turner, England; Gerard Young, England.

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AERO

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ports and installations on the airplane for refueling are stabilized, there will be inevitable confusion, they told their audience. They suggested that the time has come for positive and aggressive action to prevent costly confusion and accidents in the future, in their paper on Some Aspects of Under-Wing or Pressure Refueling.

Joseph E. Knight and C. Herbert Baxley, Intavia, Inc., presented a paper on Modern Aircraft Refueling. On the point of the large quantity of fuel to be handled in tomorrow's airplane, they considered the poss-

lity of a refueling rate of 200 gal per min or more.

They then described equipment available to handle the required amounts of fuels in airports having various densities of traffic, including stationary cabinets, trailers, trucks, tractor semi-trailer unit, and a "servicer" which is essentially a double ended truck which carries no fuel, but pumps or controls the flow of gasoline from underground supply tanks.

The authors then described a number of safety nozzles, water separators, and other equipment designed for the speedier and safer refueling of aircraft.

The fourth paper of the symposium was presented by A. O. Payne, Ohio Pattern Works & Foundry Co., whose paper was titled Fueling: A Half Forgotten Bit of Aircraft Design. Improvements on today's practices, he pointed out, could be obtained by: designing the filler neck in the landing gear well; automatic closing nozzles, high speed, quick tight couplings, and with vapor return connections; system of fuel hydrants at airports, and minimum electrical connections in the pump arrangement.

The keynote of weight reduction was again struck at the afternoon Symposium on Weight Reduction of Aircraft Braking Systems through the Use of Reverse Thrust Propellers, over which Harold Adams, chief design engineer, Douglas Aircraft Co., Inc., presided.

The three authors agreed that the reverse pitch propeller had made possible the excess loading of bombers, but pointed out that they also provide the aircraft with greater safety, greater efficiency, and will give passengers in commercial aircraft so equipped more comfort.

Much of the data presented by Wendell Eldred, Consolidated Vultee Aircraft Corp., was based on tests of the B-32 bomber, and actively participating in that project were H. H. Warden, Curtiss-Wright Propeller Division, and H. H. Kerr, Hayes Industries, Inc., authors of the Propeller and Brake sections of the report, respectively.

The presentation was made because of the interest in the results on the part of commercial aircraft designers and operators.

Approximately 407 lb (or 47.8% of the wheel brake system weight) can be saved by the use of four reversible propellers on a 92,000 lb B-32 type airplane. One-half of the wheel capacity can be eliminated. The authors concluded that one-half of the emergency brake systems may be eliminated on two- and four-engine airplanes by using reverse pitch propellers.

Combined use of the reverse pitch propeller and brakes provides a smooth, quiet, evenly-decelerated landing with a minimum wear on the braking equipment, the tests showed. Furthermore, reversing two or four propellers and not applying brakes at all, appears to be an excellent normal operating procedure where lengths of runways permit.

Caution was warned in respect to positive control surface locks, which should engage at any position desired. Reverse-sense throttles would prove of value when taxiing without brakes, and power steering is advisable. Also, steel blades should be used for reverse thrust applications to withstand normal, and sometimes severe, abrasion.

Under the chairmanship of Gerthal French, Richfield Corp., the afternoon Aircraft Powerplant Session heard papers on engine oil problems, one of which was presented by P. H. Schweitzer, Pennsylvania State College, and L. P. Sharples, Sharples Corp.

This described in detail a solution to engine failure due to insufficient inlet pressure to the pressure pump. After a brief exploration of possible solutions, they de-

scribed a shunt system in their paper on S-S System of Lubrication for Aircraft Engines.

In this scheme the scavenge pump delivers the lubricating oil into a pressure type deaerator, from which it flows into a cooler. It then passes through an eductor, ejector or aspirator, into the pressure pump which, in turn, forces it into the engine. The shunt system is not a completely closed circuit, because the storage or make up tank is vented, and deaerator has a restricted communication to the atmosphere.

The authors pointed out that at 40,000 ft altitude the conventional system would give a theoretical inlet pressure of 5 in. Hg abs, and the oil delivery would be decreased to a trickle, but the shunt system would produce 15 in. Hg abs, providing ample oil delivery.

Thus, they said, the S-S system raises the lubrication ceiling of an engine. Furthermore, it is lighter, and perhaps simpler, than the conventional system inasmuch as it uses a plain tank instead of one of the hopper type, and much smaller tubing between the tank and pressure pump. Both the deaerator and eductor are simple and light.

Furthermore, the new system permits location of the oil tank at almost any part of the airplane, irrespective of head or distance. Diluent for take-off can be introduced where needed without diluting the oil in the tank. Air is removed from the oil when it is hot and separation is thus made easier.

The work leading to the development of the shunt system was based on an NACA investigation conducted by the college on airlock and foaming, and their related problems in 1942 and 1943. Then in the summer of 1944 ground and flight tests were made by E. A. Metz, Allison Division, General Motors Corp., with satisfactory results, although the authors pointed out that the components were not specifically designed for the Bell P-39F used.

It was later tested under sea level and simulated altitudes, and is now being tested by the Air Technical Service Command, AAF, on a B-29 bomber.

The evening and final session was conducted by Dr. A. L. Klein, Douglas Aircraft Co., Inc., general chairman of the meeting, and again took up the subject of Aircraft Powerplants. Prof. C. Fayette Taylor, Massachusetts Institute of Technology, began the session with a review of the possibilities of the compress or reciprocal engine-turbine combination in his paper on Effect of Engine Exhaust Pressure on the Performance of Compressor-Engine-Turbine Units.

He reported his investigation of the effect of variations in the engine exhaust pressure on the performance of such powerplants at high altitudes, and came to the conclusion that compared with the conventional aircraft engine, high specific output and low specific fuel consumption can be obtained with the engine-compressor-turbine combination, particularly at high altitudes.

So far as he was able to determine, the ratio of engine exhaust pressure to the engine inlet pressure should be in the range of 0.70 to 1.10 for maximum net output. For the lowest net fuel consumption, the ratio should be in the range of 1.40 to 2.00, he reported.

Prof. Taylor's report, and that of the last two speakers, again sounded the keynote of lighter weights, and indicated that concentration on this point is to be found in engineering staffs from coast to coast.

M. C. Benedict, Westinghouse Electric Corp., proceeded to explain Aviation Gas Turbine Installation Problems, and suggested the closest coordination of engineers in considering the end product as a whole, and not as a conglomeration of a lot of separate parts joined together.

Unlike the conventional reciprocating aircraft engine, the turbo-jet powerplant has so little vibration that isolators or absorbers are not required. This, obviously, simplifies installation.

The gas-turbine propeller drive engine is longer than the turbo-jet unit, and the mounting system, unlike that to the turbo-jet, must take the propeller loads, and with a propeller control, requirement for ground cooling, and increased oil capacity all go to make installation more difficult.

Gas Turbines and Aircraft closed the formal presentations during the meeting. This was presented by F. W. Godsey, Jr., Westinghouse Electric Corp., and the author concluded that the commercial advantages of the jet-propelled aircraft is offset by a greater fuel cost as compared with that of a conventionally powered aircraft, particularly at ranges more than 2000 miles.

At the present stage of development, airplanes powered by jet turbines will be limited to relatively short range, very high speed, and high altitude operations which can stand the high fuel costs.

On the other hand, he said, the gas turbine with a geared propeller has immediate applications of service where requirements are much above 1000 hp at usual flight altitudes.